rachna program
2001-2006

women and child health at scale

working paper series
paper 7

widening coverage of primary immunization

care

Widening Coverage of Primary Immunization

Abstract

Background and Interventions

Strengthening primary immunization coverage was one of the key components of INHP-II, as part of a package of interventions aimed at reducing malnutrition and mortality in children at scale. The unique strength of the INHP approach was the strengthening of operational linkages between the national immunization program implemented by the Health Department and the ICDS program, which is also mandated to support universal immunization. One specific approach was the institution of Nutrition and Health Days (NHD), where a monthly fixed-day, fixed-site immunization session is held at the *Anganwadi* Center (AWC) of the ICDS program, and take home rations of supplemental food are distributed on the same day. Other specific strategies included the strengthening of delivery systems (such as mechanisms for tracking individual children, the use of "due" lists, provision of timely information about immunization sessions, etc), strengthening of program management (such as the strengthening of multi-stakeholder review forums at sector, block and district levels, methodical supervision, redrawing of boundaries to ensure that supervisory areas of health and ICDS programs coincide, etc), capacity building at various levels, complementing efforts of partner agencies in improving quality of services, use of data to drive change, and the mobilization of community groups and volunteers to support the program. All interventions were implemented at the full project scale of 78 districts across nine states. The paper aims to assess the progress in primary child immunization coverage over the life of INHP-II (from 2001 to 2006) and examines the probable determinants influencing coverage.

Methods

Evidence is drawn mainly from state-level estimates of indicators from program baseline and endline surveys, district-level estimates from three rounds of periodic assessments from one district in each of the eight project states Information from these large-sample surveys was supplemented with process information from the program management information system. All estimates presented in the results pertain to INHP-assisted regions within the respective states and districts.

Results and Discussion

At the aggregate program level, complete immunization coverage among 12-23 month olds increased by 15.9 percentage points over the project life to reach 58.2 percent by the endline. Increases were observed in almost all antigen coverage rates across all states. The lar
immunization coverage increased to 64 percent fr
measles vaccine showed the largest increase, at 2
a single vaccine decreased from 19 percent to 10 p
Uttar Pradesh and Chhattisgarh continue to have r
immunization services. The proportion of children
course reduced by a quarter between the baseline
different states. Compared to state-wide estimates
assisted areas in seven of eight states had achieve
from periodic assessments in selected districts sug
happened mostly after 2003, when INHP intervent

Background

The RACHNA Program

The RACHNA program of CARE India included two USAID-supported projects: the second phase of Integrated Nutrition and Health Project (INHP-II), which focused on child health and nutrition, and the *Chayan* project, which supported interventions for promoting birth spacing and the prevention of transmission of HIV/AIDS among groups at high risk. INHP-II, built upon the lessons and experiences of the first phase, was implemented in 747 Integrated Child Development Services (ICDS) blocks[1] in 78 districts across nine states[2] from October 2001 to December 2006 to complement the maternal and child health and nutrition (MCHN) efforts of the ICDS and the Ministry of Health and Family Welfare (MoHFW) programs. To achieve its goal of "sustainable improvements in the nutrition and health status of seven million women and children", INHP-II adopted a two-track approach – supporting service providers to improve the quality and coverage of MCHN services and systems and engaging communities to support better infant feeding and caring practices and sustain activities for improved maternal and child health and survival. The implementation was facilitated by small program teams of CARE, located at the district, state and national levels, and working closely with the functionaries of the ICDS program and the programs of the MoHFW, and with a range of partners, including local NGOs and Community-Based Organizations (CBOs). The main strategies were strengthening of existing systems, behavior change communication and capacity building. A detailed description of the program can be found in the paper, *Program Description*, in this series.

Role of RACHNA in Primary Immunization

In providing immunization services, the RACHNA program focused primarily on improving the operational effectiveness of the ICDS program and the national immunization program of the MoHFW by promoting functional convergence between the two. Thus, the results and lessons described in this paper are directly relevant to both these national programs and related stakeholders.

The district and state teams of RACHNA provided techno-managerial guidance and support to ICDS and Health department functionaries primarily at block and lower levels to maximize immunization coverage. Immunization interventions were integrated with other elements of child health. The broad components of support were:

- Strengthening delivery systems to maximize coverage
- Strengthening program management
- Training and capacity building
- Cold chain, logistics and injection safety.
- Monitoring
- Social Mobilization/Behavior Change Communication

Box 7.1 elaborates the various activities under each of these broad components.

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[1] A block is an administrative sub-unit of a district, having a population of around 100,000, and often larger. An ICDS block is usually identical to the administrative block, and comprises about 100 *Anganwadi* Centers (AWC). Not all blocks in a district and not all villages and hamlets within a block may be served by the ICDS program. INHP-II was designed to be implemented only in ICDS-served blocks, but did not necessarily cover all ICDS blocks in the districts where it was implemented.

[2] These include Andhra Pradesh (AP), Bihar (BI), Chhattisgarh (CG), Jharkhand (JH), Madhya Pradesh (MP), Orissa (OR), Rajasthan (RA), Uttar Pradesh (UP) and West Bengal (WB). Since the program was implemented in Bihar only from late 2004 onwards, results presented are only from the other eight states.

Box 7.1: Key Interventions and Approaches for Improving Immunization

Strengthening delivery systems to maximize coverage

- Encourage use of social maps and routine surveys of *Anganwadi* Workers (AWWs) and Auxiliary Nurse Midwives (ANMs) to ensure that every community and family is brought into the net of services
- Link-up pregnancy and child service registers to ensure inclusion of every birth in service registers
- Draw up and use lists of children due for immunization
- Use home visits to inform families in advance about an impending immunization session.

Strengthening program management

- Coordinate with Health department to plan and execute the fixed-day, fixed-site outreach immunization sessions
- Help the ICDS and Health departments to coordinate the immunization sessions in conjunction with the distribution of food rations from the AWC (these joint sessions were termed Nutrition and Health Days or NHD)
- Help the Health department to optimize the utilization of available vaccinators (ANMs, Lady Health Visitors and at times Multi-Purpose Health Workers (male workers) to cover all areas)
- Support vigilant review and monitoring of these efforts at two crucial levels – ICDS sector meetings with ANMs in attendance, and at the block level forums with the joint participation of the ICDS, Health and *Panchayat* representatives
- Facilitate the use of tracking mechanisms based on best available denominators at each level
- Support the ICDS and Health departments in coordinating managerial efforts to redraw boundaries of field workers and their supervisors to ensure the convergence of administrative units of the two programs converged, thus minimizing discrepancies in reported figures.

Training and capacity building

- Conduct one-time brief joint training of AWW/ANM, with a focus on management and quality areas
- Utilize available opportunities in the routine implementation schedules of ICDS and health programs to keep functionaries updated and focused on priorities.

Cold chain, logistics and injection safety

- Complement efforts of agencies such as UNICEF and WHO in minimizing breakdowns of supply and distribution lines
- Encourage use of standard protocols for matters such as cold chain maintenance, the practice of policies of opening vaccine vials even when only a few children are present, and basic injection safety protocols.

Monitoring

- Facilitate periodic coverage assessments (rapid surveys) at district level to help program management
- Support on-going assessment of quality of immunization sessions through session observations
- Facilitate review of immunization (sessions, quality, coverage) data in block/district forums.

Social mobilization/BCC

- Encourage Change Agents (CAs) community health volunteers, community based organizations (CBOs) and members of the *Panchayat* to attend, support and monitor the NHD
- Mobilize CBOs (women's groups) to disseminate information
- Support communication campaigns involving multiple channels and media including folk media.

While the program complemented efforts such as the promotion of rigorous cold chain maintenance and promotion of injection safety procedures, the primary focus of RACHNA interventions was on maximizing coverage of primary immunization through some or all of the components listed above.

In practice, there was considerable variation in the intensity of implementation of these components across states, districts and blocks, and time. By design, the interventions reached all program areas only in the last year of the program.

This paper uses available evidence to assess the progress in immunization coverage over the life of the program, examine the probable determinants influencing immunization coverage and draw lessons for making the national immunization program more effective. It focuses on primary child immunization alone. Since Hepatitis B immunization was introduced into the national immunization program later, it was not a focus of RACHNA, or of this paper. Maternal Tetanus Toxoid coverage and related issues are dealt with in the paper, *Enhancing Newborn Care,* in this series.

Methods of Assessment

The RACHNA program had three kinds of quantitative assessments featuring household surveys: (i) pairs of baseline and endline assessments; (ii) periodic rapid assessments in a panel of one district from each of the eight program states; and (iii) two evaluation research studies in two districts. In all surveys, the AWC was the Primary Sampling Unit (PSU), and respondents for the primary household level interviews were mothers of children 0-23 months of age.

Baseline and Endline Surveys

The endline survey of INHP-I (early 2001) served as the baseline survey of INHP-II. The INHP-I endline for Bihar served as the baseline for Jharkhand and the Madhya Pradesh endline served as the baseline for both Madhya Pradesh and Chhattisgarh. The INHP-I endline for Bihar served as the baseline for Jharkhand and the Madhya Pradesh endline served as the baseline for both Madhya Pradesh and Chhattisgarh, since the new states of Chhattisgarh and Jharkhand were created from a division of the erstwhile Madhya Pradesh and Bihar respectively, just prior to the INHP-endline survey.[i]

INHP-I consisted of three kinds of program areas based on intensity of interventions and effort: the "High impact" blocks, "Capacity building blocks" and "Other blocks". The 2001 survey was designed to generate separate estimates of these three areas through a multi-stage sampling design: a fixed number of blocks and PSUs was randomly picked from each of the three areas. A total of 540, 540 and 832 respondents (mothers of children 0-23 months old) were selected respectively using a predetermined random selection process. The interview tool, common for all children between 0-23 months, covered all interventions – antenatal, natal and newborn care, infant feeding and immunization. State-level estimates, derived by applying population weights to the three areas, are used for all comparisons with the endline, without reference to the three kinds of program areas.

The endline survey of INHP-II (early 2006) was used as a multistage sampling design, but this differed in some respects from the baseline. The respondents (mothers of children between 0-23 months old), were drawn from two groups. The mothers of children 0-5 months of age were asked questions related mainly to antenatal, natal and newborn care and breastfeeding, while mothers of children 6-23 months of age were interviewed with questions mainly related to complementary feeding and immunization. This helped minimize recall bias and capture more recent events, likely to have been influenced by program interventions. The sample size was sufficient to detect a ten percentage point difference in an estimate with 95 percent confidence levels and 80 percent power, and an assumed maximum design effect of 1.8. The numbers of PSUs and blocks selected in each state varied according to the birth rates, being higher in states with lower birth rates. Blocks were selected in a manner that ensured proportionate representation of urban, rural and tribal blocks, and PSU selection within a block ensured proportionate representation of demonstration sites,[3] replication sites and other sites. Sampling frames were generated for children in the age group of 0-5 months and 6-23 months by prior house-listing and the target sample picked by circular systematic sampling, making allowance for a non-response rate of 15 percent. For each group, the target number to be completely interviewed was 733. Effectively, this resulted in a virtually self-weighted sample for each state.

Periodic Rapid Assessments (RAPs) in the Panel Districts

In order to monitor progress in outcomes to inform program strategies, a panel of one district from each of the eight states was established in 2003, where three rounds of periodic assessments were conducted between 2003 and 2005 at approximately annual intervals. The universe for these assessments was the first phase replication sites (the first batch of 25 percent AWCs in the district where at-scale implementation began).

Mothers of children 0-5 months of age were interviewed on antenatal, natal and newborn care and breastfeeding, while mothers of children 6-23 months of age were interviewed on complementary feeding and immunization. Round 1 had a two-stage design, first randomly selecting five blocks from each district, and then five PSUs from each block, followed by selecting a fixed number of 0-23 months old from each PSU, whose mothers were respondents. The target sample size was 150 for children 0-5 months old and 450 for children 6-23 months old. Rounds 2 and 3 used one-stage design, directly picking 90 PSUs from the universe, spread across all blocks in the district, and then randomly selecting the target sample (460 each for the two age groups of 0-5 and 6-23 months) from a sampling frame generated by house-listing after allowing for a 15 percent non-response. The latter samples were sufficient to detect a difference of 10 percentage points in estimates of two surveys with 95 percent confidence and 80 percent power,

[3] As described in the paper, *Program Description*, a Demonstration Site (DS) was an AWC that held an NHD every month, had a community group that managed nutrition and health activities, had at least three active Change Agents and had other need-based innovations. The DS were largely supported by local NGOs, and served to demonstrate how these "best practices" were to be implemented, thus facilitating their replication to the rest of the district. The AWCs beyond DS that were reached by end-2004 were termed Replication Sites (RS) and the rest as "Others", in order to provide a sense of the duration of RACHNA interventions in different AWC.

assuming a small design effect. The estimates from the first round were expected to be less precise, particularly for the smaller sample of the 0-5 month group. The tools used in Round 1 were modified to add more questions and refine existing ones, while ensuring maximum comparability.

Comparisons of Coverage Rates with Other Surveys

National Family Health Survey-2 (NFHS-2) and National Family Health Survey-3 (NFHS-3)

Comparisons between NFHS-3 and INHP surveys are based on the premise that, for indicators that have comparable definitions, NFHS estimates effectively represent the weighted average of INHP-served and non-INHP-served areas of a given state, and that differences between these areas are primarily on account of INHP interventions. In reality, other factors could play a role in causing these areas to differ; such potential factors are described in the paper where relevant.

The NFHS and the INHP surveys do differ slightly in the way immunization data is collected and analyzed. In the NFHS, after having recorded the information from the immunization card, the respondent is asked, referring to each antigen and dose, whether it was administered. If a vaccine has not been recorded in the card but is reported by the respondent, the information collected from the card is accordingly modified, using separately identifiable codes. For respondents who do not produce an immunization card, they are asked to recall information about the coverage of antigens which is recorded separately. In the INHP surveys, card data is retained as recorded in the card, while recall information is also recorded separately, without reference to the card. However, when estimating "either source" coverage figures (which are used in this paper), recall information is given preference over card data in both surveys, and it is unlikely that the INHP and the NFHS methods would produce significantly different estimates.

Coverage Evaluation Surveys (CES)

In the Coverage Evaluation Surveys (CES) conducted by UNICEF, card data is not separately recorded, but cards are used to supplement recall information obtained from respondents, approximating the "either source" estimates of the NFHS. A large number of process questions related to immunization are asked, but available reports do not carry significant determinants analysis. As in the case of NFHS, CES is also designed to cover all areas, not just the ICDS coverage areas. There is limited use of CES data in this paper.

In tabulating and presenting results, estimates of indicators are presented separately for each district or state as the case may be, and in most cases, the average program-wide estimates are not emphasized. This pattern has been followed to retain the focus on individual states and districts, among which there is considerable variability.

Also, statistical significance testes are not presented for most primary results, such as when comparing estimates for indicators across baseline and endline surveys, or across rounds of RAPs. Most of the surveys were large sample surveys, designed to detect differences of 10 percentage points or more between two comparable rounds. While confidence intervals or p-values could have been

presented, this would have made the already large tables, each bearing results from eight states or districts, even less user-friendly. Instead, the authors have taken the view that it is safe to assume that a difference of 10 percentage points or more between rounds is likely to be statistically significant in most cases, and that showing statistical significance for differences of less than 10 percentage points may not be convincing from a program perspective. Thus, descriptions of results also generally distinguish between differences of 10 percentage points or more (as being statistically significant and programmatically relevant in most cases), and lesser differences (as being not convincing in most cases). While this approach oversimplifies the presentation of results, it should help the general reader interpret results more easily. More experienced and interested readers will look deeper, in any case.

Results and Discussion

In practice, there was considerable variation in the intensity of implementation of these components across states, districts and blocks, and over time. By design, the interventions reached all program areas only in the last year of the program.

Changes in Immunization Coverage between Baseline and Endline Surveys

Table 7.1 presents changes in individual vaccine coverage rates from the baseline to the endline, including the state-specific and weighted[4] program-wide coverage estimates, by card or recall ("either source") as well as left-out and drop-out rates.[ii]

At the aggregate program level, complete immunization coverage went up 15.9 percentage points to reach 58.2 percent by the endline. Among individual antigens, measles vaccination showed the largest increment (20.5 percentage points) to reach about 68 percent by endline, followed by DPT3 (about 14 percentage points increment to reach 72 percent), OPV (about 13 percentage points increment to reach 70 percent), and BCG (9 percentage points increment to reach 88 percent). All of these are statistically significant differences.[5]

While each state showed increments from the baseline, the variation across states was wide. For instance, increases in complete immunization coverage ranged from a low 4.2 percentage points in Chhattisgarh to a remarkable 36.3 percentage points in Jharkhand. Uttar Pradesh was the only other state that showed less than 10 percentage point increment. Except for Andhra Pradesh, however, complete immunization rates remain well below the 80 percent mark.

Similar increments were seen in the case of individual antigens. The ranges of increments in the coverage of different antigens at the aggregate program level were: BCG: 0.5 to 35.8 percentage points; DPT3: 1.7 percent to 36.4 percent; OPV3: 4.1 to 34.9 percentage points; and Measles: 8.9 to 54 percentage points

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[4] Weighted by the relative population size representing each state.

[5] It should be noted that only about a third of all respondents were able to show interviewers an immunization card for the concerned child, and thus these rates are heavily based on the recall of the respondents. West Bengal is the only exception, with more than 80 percent producing an immunization card; Orissa (57.4 percent) and Andhra Pradesh (47.9 percent) are the only other states where a significant contribution could have come from card data.

Table 7.1: Immunization coverage rates (card or recall) among 12-23 month olds, Baseline (2001) and Endline (2006), RACHNA program areas, state-wise and program-wide

	AP			CG			JH			MP			OR			RA			UP			WB			All		
	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff	BL	EL	Diff
N	*351*	*468*		*371*	*384*		*443*	*437*		*371*	*409*		*323*	*428*		*376*	*450*		*328*	*466*		*348*	*474*		*2911*	*3516*	
Mothers who reported having received immunization card	74.7	92.2	**17.5**	36.2	46.1	**9.9**	42.6	89.5	**46.9**	36.2	67.8	**31.6**	55.6	74.2	**18.6**	29.6	60.7	**31.1**	27.5	59.8	**32.3**	86.0	93.3	**7.3**	52.9	73.1	**20.2**
Mothers able to show immunization card	35.3	47.9	**12.6**	16.9	20.7	**3.8**	15.1	40.7	**25.6**	16.9	42.6	**25.7**	25.2	57.4	**32.1**	8.4	21.4	**13.0**	19.3	27.2	**7.9**	67.6	82.5	**14.9**	29.0	42.6	**13.6**
BCG	95.6	97.1	**1.5**	82.9	82.4	**-0.5**	59.7	95.5	**35.8**	82.9	88.3	**5.4**	91.3	94.2	**2.9**	62.4	72.2	**9.8**	66.1	79.0	**12.9**	85.1	91.9	**6.8**	78.7	87.5	**8.8**
DPT3	87.4	94.5	**7.1**	51.5	67.4	**15.9**	34.9	71.3	**36.4**	51.5	76.5	**25.0**	69.3	78.8	**9.5**	34.6	52.1	**17.5**	55.2	56.9	**1.7**	65.3	81.8	**16.5**	57.5	71.6	**14.1**
OPV3	85.8	94.1	**8.3**	49.8	58.8	**9.0**	36.4	71.3	**34.9**	49.8	73.6	**23.8**	68.8	77.6	**8.8**	33.6	51.3	**17.7**	53.3	57.4	**4.1**	66.5	81.9	**15.4**	57.1	70.1	**13.0**
Measles	70.7	84.1	**13.4**	46.5	55.4	**8.9**	32.8	86.8	**54.0**	46.5	64.9	**18.4**	50.6	74.1	**23.5**	26.7	47.2	**20.5**	42.3	53.1	**10.8**	58.0	79.5	**21.5**	48.0	68.4	**20.5**
Complete immunization	66.1	82.0	**15.9**	39.1	43.3	**4.2**	27.6	63.9	**36.3**	39.1	55.4	**16.3**	44.8	64.7	**19.9**	22.3	40.2	**17.9**	37.8	43.0	**5.2**	51.4	74.4	**23.0**	42.3	58.2	**15.9**
Children who did not receive a single vaccine (card+recall)	2.0	2.2	**0.2**	14.5	15.2	**0.7**	39.3	2.7	**-36.6**	14.5	8.2	**-6.3**	7.7	4.2	**-3.5**	35.9	25.4	**-10.5**	28.6	16.9	**-11.7**	13.3	6.6	**-6.7**	19.2	10.2	**-9.0**
BCG-Measles drop-out	26.0	13.4	**-12.7**	43.9	32.8	**-11.1**	45.1	9.1	**-35.9**	43.9	26.5	**-17.4**	44.6	21.3	**-23.2**	57.2	34.6	**-22.6**	36.0	32.8	**-3.2**	31.8	13.5	**-18.4**	39.0	21.8	**-17.2**
"True" Drop-out	32.6	16.2	**-16.4**	54.3	48.9	**-5.3**	54.5	34.3	**-20.2**	54.3	39.7	**-14.6**	51.5	32.5	**-19.0**	65.2	46.1	**-19.1**	47.1	48.3	**1.2**	40.7	20.3	**-20.4**	47.6	35.2	**-12.5**

BCG-Measles drop-out: Percentage of BCG vaccinees failing to receive measles until the day of interview
"True" drop-out: Percentage of those who received at least one vaccine failing to complete primary immunization until the day of interview
BL=Baseline, EL=Endline

(Table 7.1). The largest increment in the case of each antigen was seen in Jharkhand. Although Jharkhand contributed about 15 percent weight to the program average across states, the program-level increments cannot be attributed primarily to changes in this state alone.

In the case of Chhattisgarh/Madhya Pradesh and Jharkhand/Bihar, there have been shifts in the program universe since the baseline, and results for these states should be interpreted with caution. Please see endnotes[ii] and the discussion in the *Methods Used for Assessments* paper for details of the issues involved.

Among achieved coverage rates at the endline, DPT3 coverage is higher than measles coverage in all states other than Jharkhand. In most states, OPV3 coverage tends to trail DPT3 coverage by small margins.

Program-wide, the proportion of children not receiving a single vaccine (completely left out of immunization services) reduced by about a third from about 19 percent at the baseline to about 10 percent at the endline. Rajasthan (25.4 percent), Uttar Pradesh (16.9 percent) and Chhattisgarh (15.2 percent) continue to have substantial left-outs even at the endline, while the rest of the states have less than 10 percent left-outs – Andhra Pradesh (2.2 percent) and Jharkhand (2.7 percent) have the least left-outs (Table 7.1). Jharkhand had the most impressive reduction in left-outs, beginning as the state with the highest proportion of children completely left out at the baseline (39 percent), to one with the lowest left-out proportions at the endline. Other states showed only small change in the proportion of children left out of immunization coverage.

The vaccine drop-out rates among children represent the proportion of children who start receiving vaccines, but do not get one or more of the remaining vaccines in the schedule offered by the National Immunization Program. Table 7.1 presents drop-outs estimated in two ways:

1. The conventional indicator, BCG to measles vaccine drop-out, is expressed as the proportion of children receiving BCG vaccines who had yet not received measles vaccine by the time they were interviewed in their second year. Program-wide, at the baseline, about 39 percent of those who received BCG had failed to receive measles vaccine. At the endline, this proportion was almost halved to about 22 percent. Every state contributed to this reduction in drop-outs, ranging from about three percent in Uttar Pradesh to 36 percent in Jharkhand (Table 7.1).

2. A more comprehensive estimate of drop-outs is the children who failed to complete all vaccines expressed as a proportion of children who received any vaccine. This is presented in Table 7.1 as "true" drop-outs. Again, there are clear reductions in drop-outs across all states, with Jharkhand and West Bengal showing the largest reductions of about 20 percent points from baseline to endline. Program-wide, drop-outs have been reduced by about a quarter (48 percent to 35 percent).

However, drop-out rates remain substantial across most states even at the endline, including in those states that apparently performed well, such as

Jharkhand, and "true" drop-out rates range from 16 percent in Andhra Pradesh to 49 percent in Chhattisgarh at the endline.

In sum, there have been significant and programmatically relevant increases in antigen coverage rates across all states over the life of the program. At the same time, there are substantial variations across states, in terms of both the magnitude of increments and achieved coverage rates. Among states that had relatively lower coverage at the baseline, rates still remain below national program objectives with the exception of Jharkhand.

Immunization coverage in INHP-II areas at the endline, compared to NFHS-3 and CES

The latest round of CES survey data was collected in late 2005, the NFHS-3 in 2005 to 2006, and the INHP-II endline survey was conducted between February and March 2006, making them all roughly contemporaneous. Comparisons of coverage rates across these three surveys are presented here. Changes between the NFHS-2 and NFHS-3 (provisional estimates) and the changes between baseline and endline surveys of INHP-II are also examined to determine possible differences in the rate of change in the areas represented by these pairs of surveys. The time-span between the National Family Health Survey (NFHS-2) and 3 is approximately eight years and that between the baseline and endline surveys of INHP-II approximately five years and this is factored into estimating the rate of change. Also, it is worth noting that since the INHP-II efforts reached their full extent of implementation only in the last year of the program, it is likely that the pace of change accelerated during the latter years of the program, rather than being uniform over the life of the program.

Figures 7.1, 7.2 and 7.3 compare coverage estimates of CES (rural) 2005, NHFS-3 (rural) and the RACHNA endline for each state for DPT3, measles and complete vaccination, respectively among children 12-23 months of age.

- With the exception of measles vaccine coverage in Chhattisgarh, the RACHNA endline estimates for coverage are consistently higher than NFHS-3 (Rural). It appears that higher DPT3 coverage rates are largely responsible for the large differences in complete immunization rates between NFHS-3 and INHP-II. The differences in measles coverage rates are comparatively smaller.

Figure 7.1: DPT3 coverage comparisons for RACHNA program states - CES (rural, 2005), NFHS-3 (rural, 2006) and RACHNA Endline (2006).

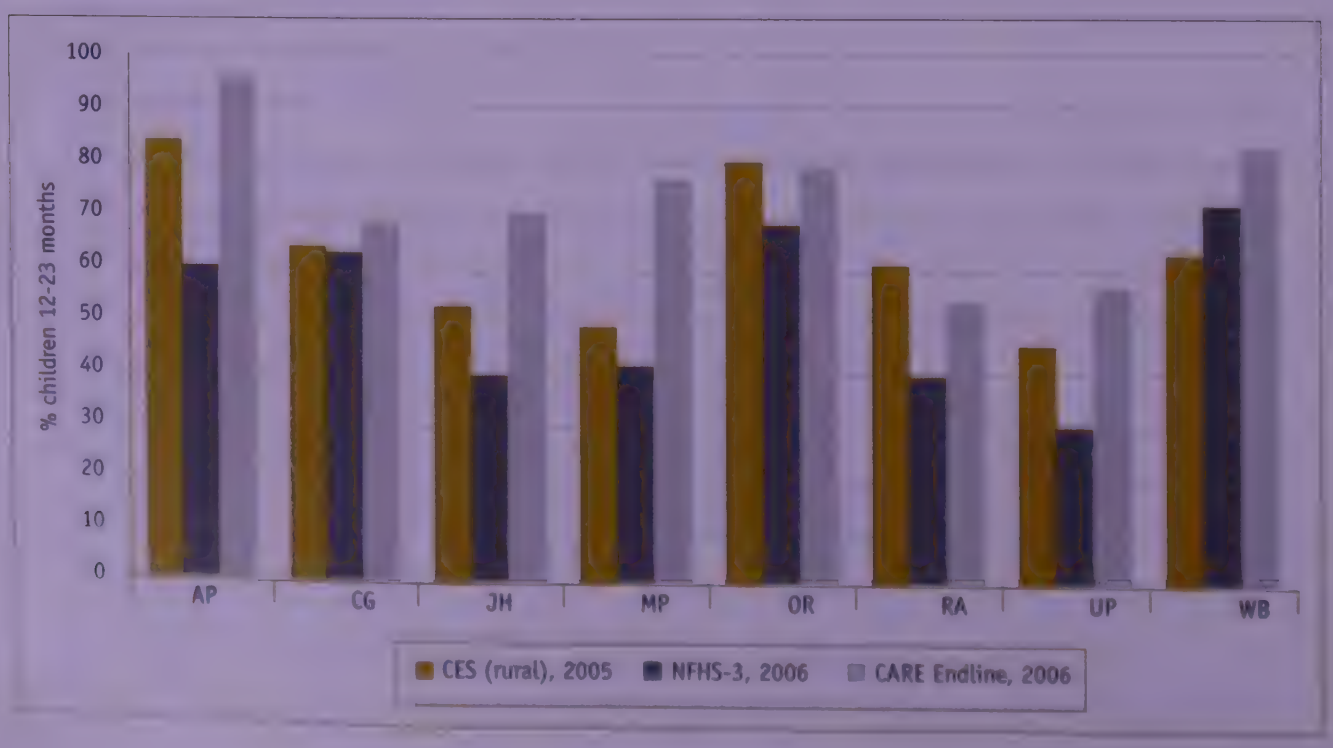


Figure 7.2: Measles coverage comparisons for RACHNA program states - CES (2005), NFHS-3 (2006) and RACHNA Endline (2006).

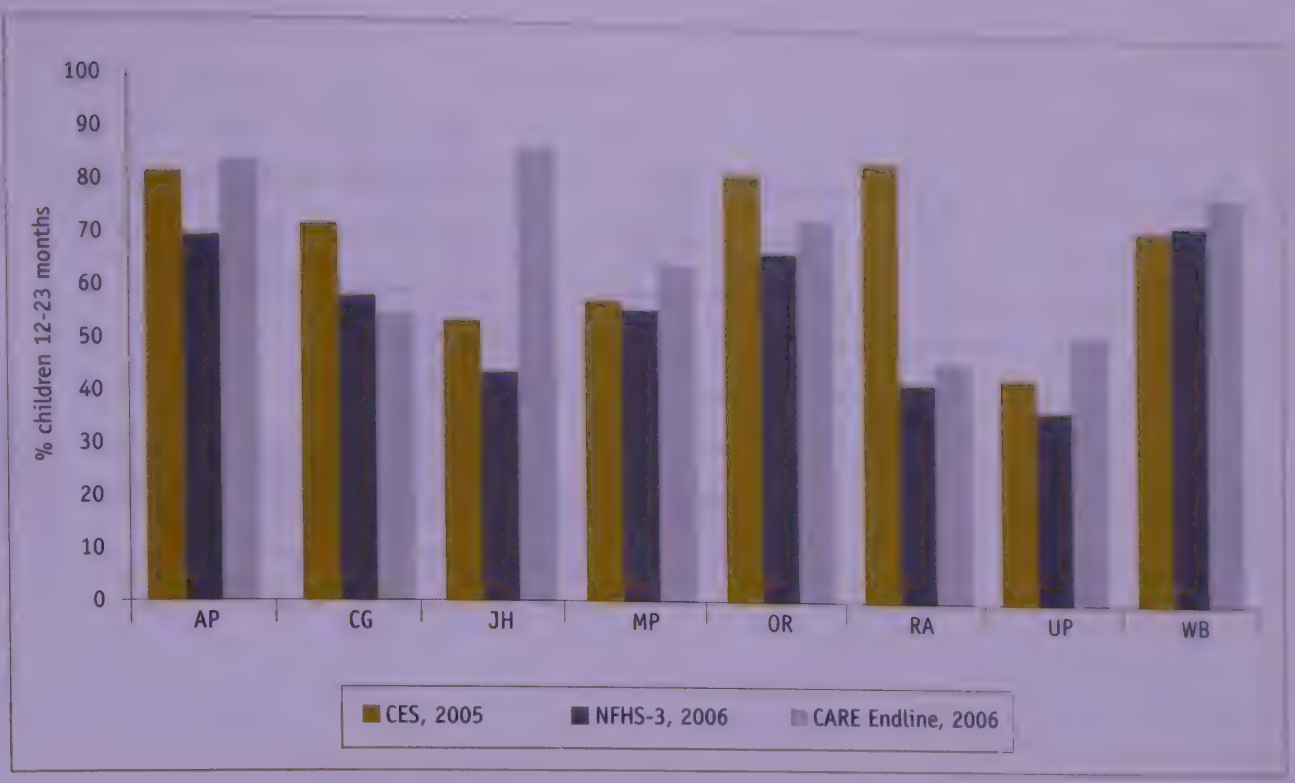
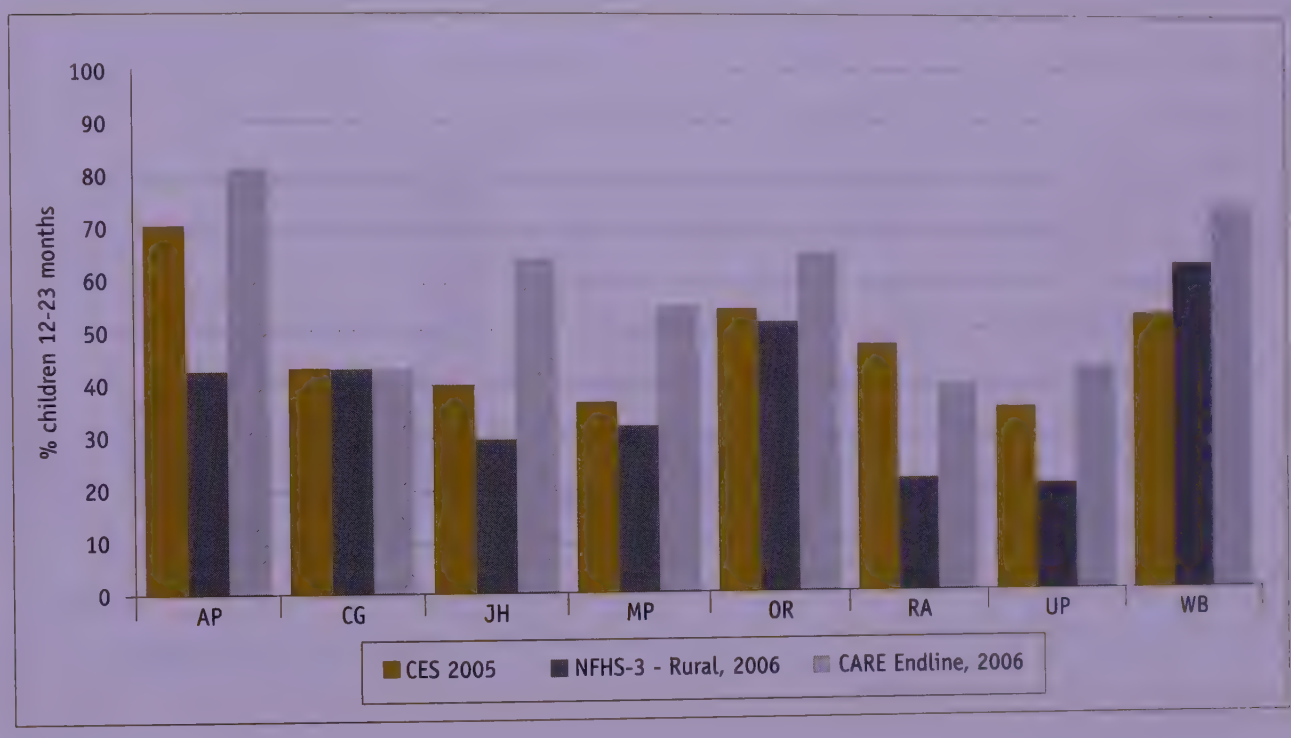


Figure 7.3: Complete immunization coverage comparisons for RACHNA program states - CES 2005, NFHS-3 (2006) and RACHNA Endline (2006).



- The comparison with CES 2005 figures for DPT3 and measles vaccines is not as consistent, being lower in INHP areas in some states and comparable or higher in others. In the case of complete immunization, however, the INHP-II endline estimates are at least 10 percentage points higher than CES 2005 figures in four of the eight states (Andhra Pradesh, Jharkhand, Orissa and West Bengal), while the differences in the rest of the states are less than 10 percentage points.

Figures 7.4 and 7.5 compare state-wide increments, as estimated by the difference between NFHS-2 and NFHS-3 and the differences between baseline and endline estimates in INHP-II areas of the same states. The increments across the pairs of surveys are expressed as a percentage of the respective baseline, to partly compensate for differences in baselines. In the case of three of the eight states (Andhra Pradesh, Orissa, Rajasthan), the total (Figure 7.4) and average annual increments (Figure 7.5) in INHP-II areas appear to exceed the respective state-wide increments as indicated by NFHS. In the case of Jharkhand, Madhya Pradesh, Uttar Pradesh and West Bengal, the pro-rated annual increments state-wide and in INHP-supported areas appear

Figure 7.4: Full immunization coverage: Percent increment between surveys - NFHS-2-3 vs CARE Baseline-Endline.

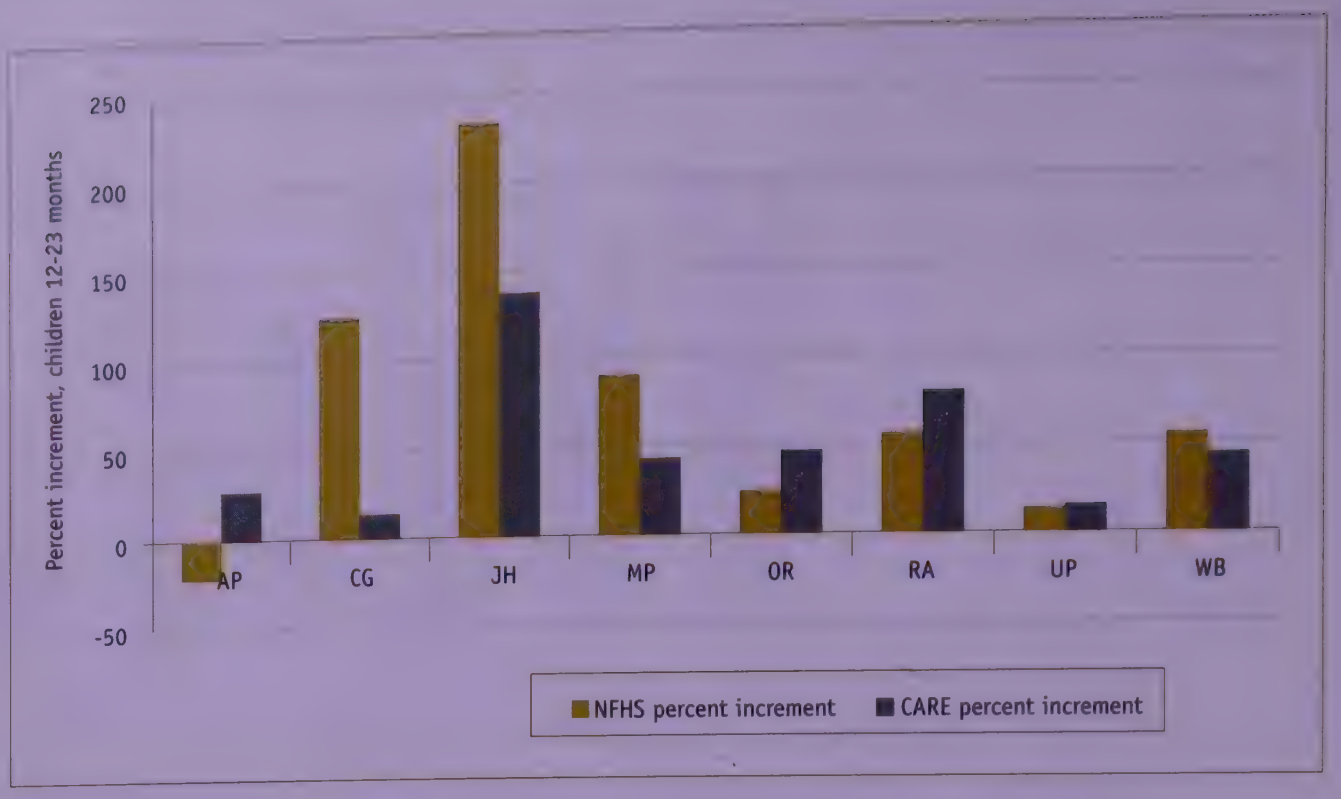
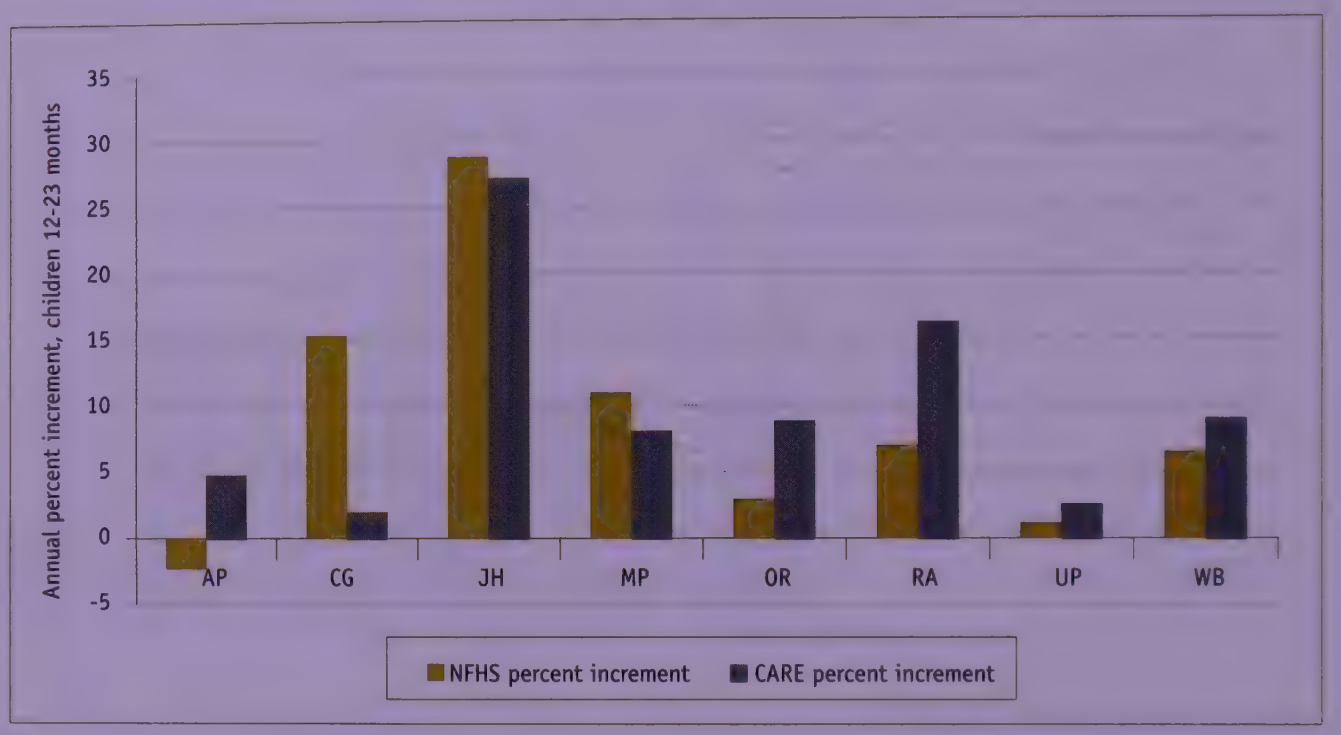


Figure 7.5: Full immunization coverage: Annual percent increment between surveys - NFHS-2-3 vs CARE Baseline-Endline.

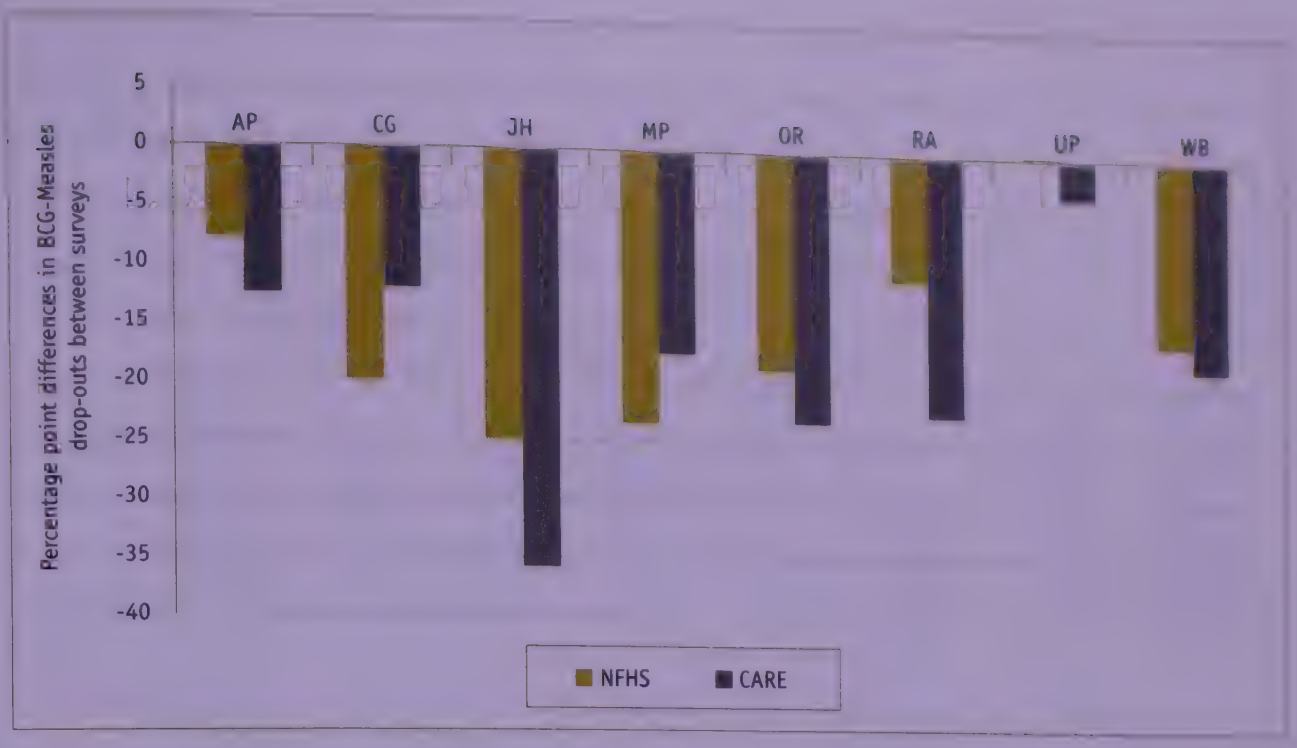


about equal (the differences being less than five percentage points annually), while in the case of Chhattisgarh, state-wide increments exceed increments in INHP-II areas.

Vaccination drop-out rates, exemplified by the BCG and measles drop-outs presented in Figure 7.6, also follow similar patterns. As can be seen, the reductions in drop-outs in INHP-supported areas between baseline and endline surveys have exceeded reductions in drop-outs state-wide (as represented by NFHS) in all states other than Chhattisgarh and Madhya Pradesh. As indicated earlier, some of these results need careful interpretation in the light of the known shifts in program universe since the baseline, for both, INHP and NFHS (Please see endnote[i]).

Since estimates for children not receiving a single vaccine are not yet available for the NFHS-3, it is not possible to present comparisons on either complete left-outs or for "true" drop-outs. Similarly, since estimates of timely immunization have not been released for the NFHS-3, it is not possible to present any comparable estimates for this indicator.

Figure 7.6: Reduction in BCG-Measles dropout percentage, NFHS-2-3 vs CARE Endline-Baseline.



In sum, immunization coverage appears to have increased faster and reached higher levels across INHP-II areas, as compared to other areas in the respective states in most instances.

One clear and well-recognized pattern that emerges from the results is that program areas vary widely, both in terms of the coverage and change over time.

The state-level variations were not always predictable, even by field teams. The large increases in Jharkhand, for instance, appear to have been achieved by very recent intense catch-up rounds that happened in the state (starting 2005). These campaigns, owned by all major stakeholders and development partners, were focused on micro-planning and execution. This alone was not expected to produce very significant results, given the rather weak health infrastructure in the state. The uncertain baselines for this state, for both the INHP-II program and for NFHS, make the magnitude of change a little uncertain, but coverage by the endline was certainly higher than expected, by any measure. Even as recently as 2004, the projected coverage rates were in the order of 20-40 percent, which was borne out by the RAPs results from Lohardaga, the panel district in Jharkhand. One explanation for the rather unusual differences seen between NFHS-3 and INHP endline levels of achieved coverage could be that, despite covering most districts in the states, the RACHNA program covers only about half the ICDS blocks in the state and probably does not cover some of the most difficult blocks in many districts. The larger improvements in INHP-II areas as seen in the endline appear to have been achieved because the field presence of RACHNA teams in "better" districts further boosted the capacities of local teams to achieve results through catch-up rounds. RACHNA's focus on improving nearly-absent tracking systems, including simple service registers, could have contributed significantly. Again, this clearly establishes how even a marginally stronger system can achieve more if given critical support. Whether Jharkhand can sustain these remarkable achievements will certainly depend on whether these changes have been achieved on the strength of improved delivery systems.

The high level of achieved coverage rates in Andhra Pradesh and West Bengal are undoubtedly a function of strong systems and many years of focused efforts,

as well as of communities which have learnt to accept and expect immunization as a part of the normal growth of children. Field observations attest to the strong recording and tracking systems in place, as well as responsible, focused leadership. In West Bengal, in particular, the strong role of the Panchayat in monitoring both health and ICDS programs is significant. In both states, INHP helped strengthen existing local approaches, encouraged data use and review and promoted convergence between ICDS and Health.

In Orissa, more than in any other state, the increases in complete immunization rates can be largely attributed to increases in measles immunization. While individual antigen coverage rates are around 75 percent or higher, complete immunization coverage is significantly lower, indicating that there are gaps in tracking systems. On the ground, since Orissa ICDS and Health field teams appear to have relatively strong recording and reporting systems, it seems likely that actual follow up of individual children is not adequately supervised. The story of Madhya Pradesh is similar, but it lags behind on measles coverage.

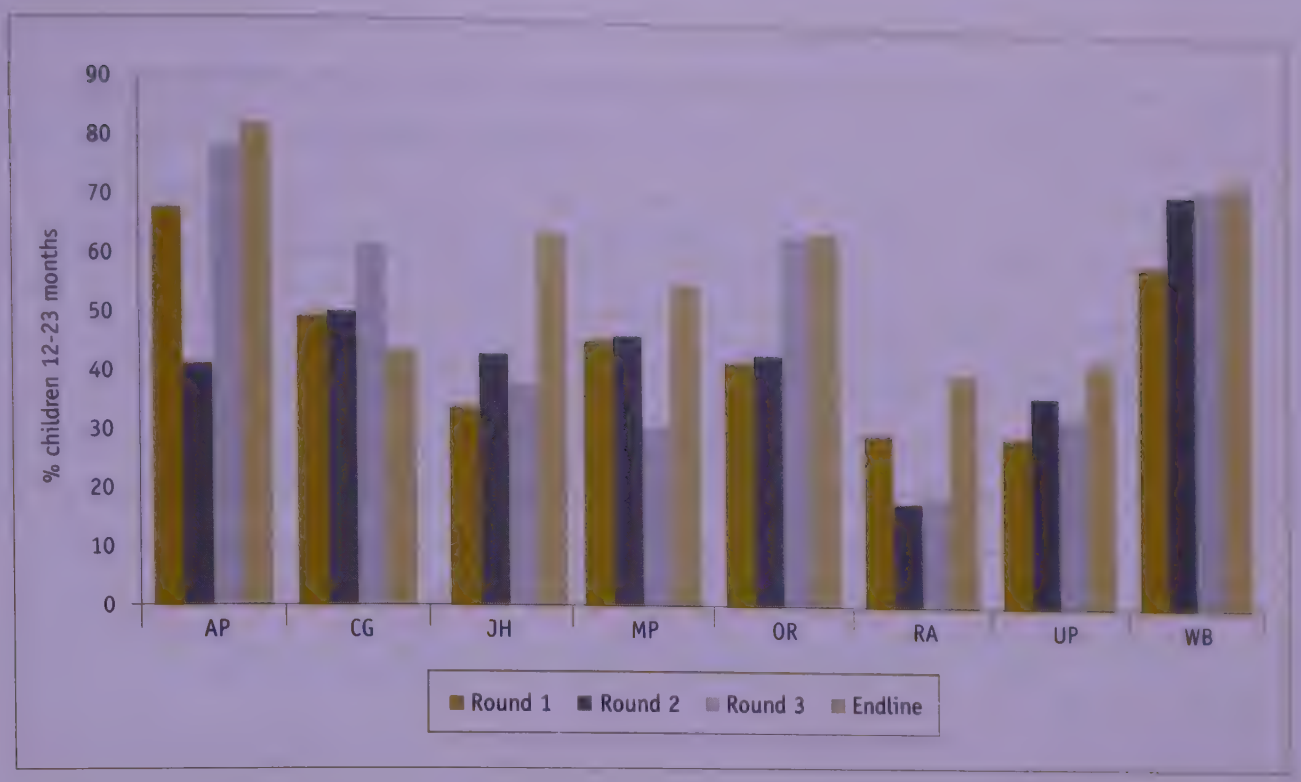
In Chhattisgarh, the relatively high left-out proportion, the unusually large gap between DPT3 and OPV3 (possibly a measurement error) as well as the poor measles coverage have probably contributed to the low complete immunization coverage in spite of the apparently rapidly falling mortality rates (SRS, 2003 to 2005), and of the state having enthusiastic leadership that is supporting several innovative approaches and community level interventions.

In Rajasthan, the relatively fast increase in coverage rates holds promise, although absolute coverage rates are still very low. Of late, the state government has been very strongly pushing for improved routine immunization. INHP efforts have evidently not led to significant change due to fundamental weaknesses in the system and poor accountability structures in both Chhattisgarh and Rajasthan that set them apart from states such as Andhra Pradesh, West Bengal and Orissa. Additionally, in Uttar Pradesh, the influence of the pulse polio program on routine services is felt maximally and indeed leads to a vicious cycle, since one of the reasons for its failure to eliminate polio is the poor penetration of routine immunization services. RACHNA efforts have evidently been inadequate to substantially overcome fundamental system and design defects here.

There is limited data available from independent surveys to document variation within a state. The best illustration comes from the comparison of the performance of the "panel" district and that of the corresponding state. The three rounds of periodic rapid assessments (RAPs) conducted in one district in each of the states in 2003, 2004 and 2005 provide the opportunity to make such comparisons with the state-wide baseline/endline surveys.

Figure 7.7 compares complete immunization coverage over three rounds in the panel districts and the coverage in the corresponding state as seen in the endline survey in early 2006. While in third round of RAPs, district figures are close to state figures in Andhra Pradesh, Orissa, Uttar Pradesh and West Bengal, the differences in other states exceed 10 percentage points, with the state level coverage rates being higher except in the case of Chhattisgarh. Also of interest

Figure 7.7: Trends in complete immunization coverage in the panel district assessments Rounds 1-3 (2003, 2004, 2005), and state-level Endline (2006).



are the annual fluctuations at the district level, such as in Andhra Pradesh, Madhya Pradesh and Rajasthan.

This variation across districts (and possibly across sub-district regions, although not measured in the program) over time probably represents the complex influence of variation in factors such as socio-demographics, geographical access, and intensity of INHP efforts – the last being particularly prone to changes over time. Some of these have been referred to above, and some, for which survey evidence is available from the INHP, are dealt with in the subsequent sections.

Factors Influencing Change in Immunization Coverage

A number of program and non-program factors are known to affect immunization coverage rates, from program experience nationally and globally. The Universal Immunization Program (UIP) review of 2004 identified and highlighted a large number of deficiencies in the national immunization program and made concrete recommendations for structural and operational reform. Several of the measures recommended were already in use in the INHP program areas. While no specific studies were conducted to directly measure the effect of individual processes and factors on immunization coverage, available information from the INHP-II baseline and endline surveys, the RAPs and the Health Management Information Systems (HMIS) have been analyzed to understand the influence of several variables likely to influence immunization coverage. This analysis is done more from a programmatic perspective, rather than an academic one. It should be noted that due to lack of baseline information on some of the variables discussed below, a comparative analysis of change over time has not been possible.

The influence of NHD and food rations

INHP promoted the systematic conduct of monthly Nutrition and Health Days (NHDs) to increase health service coverage. These served as a means to practically converge ICDS and Health services and combined the immunization and antenatal care services provided by the ANM and the take-home rations given out on the same

fixed-day once a month at the AWC. NHDs provided the attraction of supplementary food rations in addition to the known benefits of a fixed-day, fixed site approach to outreach services for child immunization as well as antenatal care.

Considerable effort was involved in coordinating the ICDS and Health Department program field schedules, such that the distribution of take-home rations (THR) at the AWC for pregnant and lactating women and children under three years of age took place on the same day as the visit of the ANM to the village for the provision of immunization and ANC services. In states where outreach services of ANMs were well-established, it involved re-doing the field visit rosters of ANMs and rescheduling THR days by ICDS. In some states, where the concept of outreach services by ANMs was itself new, it involved greater effort. Not all states at all times were able to fully institutionalize NHDs.

The monthly NHDs were monitored and by the endline, about two-thirds of all AWWs were reporting that NHDs were happening every month (defined as THR and either immunization or antenatal care by the ANM happening on the same day in the month at the AWC). Antenatal check-ups required a minimum degree of privacy, which was not available at AWCs, and this matter was never satisfactorily resolved. The regularity of food supply heavily influenced the regularity of NHDs. In early 2003, when the CARE-supplied PL480 Title II grain, CSB (Corn Soya Blend) was replaced by state government provided grain in the INHP-II areas, the monthly NHDs were affected, at least in the short term, as a result of the transition and the associated interruptions in the supply of food supplements. In some places, the insistence on hot cooked food for everyone further complicated the picture.[6]

The decision to provide food supplements universally to all pregnant and lactating women and children six months to six years old, and to extend the ICDS scheme to all villages, should effectively make the NHD approach also universal.

Program monitoring data indicated that by the end of INHP-II, almost 60 percent of the AWCs reported conducting regular NHDs. West Bengal remained at about 50 percent, while Chhattisgarh and Rajasthan reported in excess of 75 percent of AWC holding NHD in the last year of the program. The endline interviews of AWW also provide a similar picture, presented in Table 7.2. About 90 percent or more of AWW in states other than West Bengal reported that fixed-day immunization or antenatal care services had been provided at least once in the three months preceding the endline interviews. Overall, about two-thirds of them reported that such services had been provided in the previous month. In states other than West Bengal, about three-fourths or more of AWW also reported that food supplements had been distributed on the same day as the fixed-day health services at least once in the previous three months. Between 47 percent and 77 percent of AWW reported that this had happened in the previous month, indicating that not more than 60 percent of AWC are able to hold a NHD by definition every month.

This level of penetration of NHDs could partly explain the increase in immunization coverage across most states. Figure 7.8 shows that there is only

[6] It should be mentioned here that take-home rations (THR) are given out either weekly, fortnightly or, monthly and only one of these several THR sessions is coordinated with fixed-day, fixed-site immunization services. Also, while all families are eligible for THR as per the distribution schedule, a given infant in a family is due for immunization only on about five days in a year.

Table 7.2: Regularity of NHD and immunization sessions as reported by AWW, Endline (2006)

	AP	CG	JH	MP	OR	RA	UP	WB	All
Number of AWWs interviewed at the endline	*196*	*159*	*106*	*185*	*156*	*134*	*131*	*162*	*1229*
Immunization or antenatal services provided at the AWC:									
at least once in the previous three months	95.9	87.6	92.5	87.2	89.2	94.0	86.6	65.2	82.5
in each of the previous three months	84.2	66.7	72.6	65.4	73.2	71.6	60.4	62.4	66.0
Food supplements distributed on the same day as the services were provided									
at least once in the previous three months	91.8	83.1	84.0	78.2	73.9	88.1	79.1	55.5	74.9
in each of the previous three months	77.0	66.7	68.9	63.3	51.0	63.4	55.2	47.0	58.0
AWC where ANM gives vaccines on days other than NHDs	57.7	81.1	81.1	53.0	70.3	67.2	69.8	52.6	65.6

a rough association between the levels of NHD regularity reported by AWW and the complete immunization rates estimated from household surveys, although it is not entirely appropriate to draw conclusions from such broad comparisons. Field observations reflect variable effectiveness in delivering services on NHD by AWWs and ANMs. Several elements such as defining the denominators, systematic tracking of individual children by preparing due lists for each session, availability of vaccines and opening of vials irrespective of the number of children are also critical in influencing immunization coverage rates.

It is also interesting to note, however, that a large proportion of the AWWs, ranging from 53 percent to 81 percent, reported that the ANMs administer vaccines in their AWC catchment area on days other than NHDs as well (Table 7.2), making it difficult to attribute changes in immunization coverage to NHDs alone. Surprisingly, the proportion of villages where ANMs reportedly provided vaccination services on days other than NHDs did not differ significantly between villages having or not having a health sub-center[7] (data not shown in the table), though one might have predicted that such extra vaccination day would have been more common in sub-center villages. This may indicate that the ANM's roster and coordination with the AWW may be significantly less than perfect.

One expected effect of the NHD approach was that immunization sessions held at decentralized locations (the AWC) would increase the proportion of children

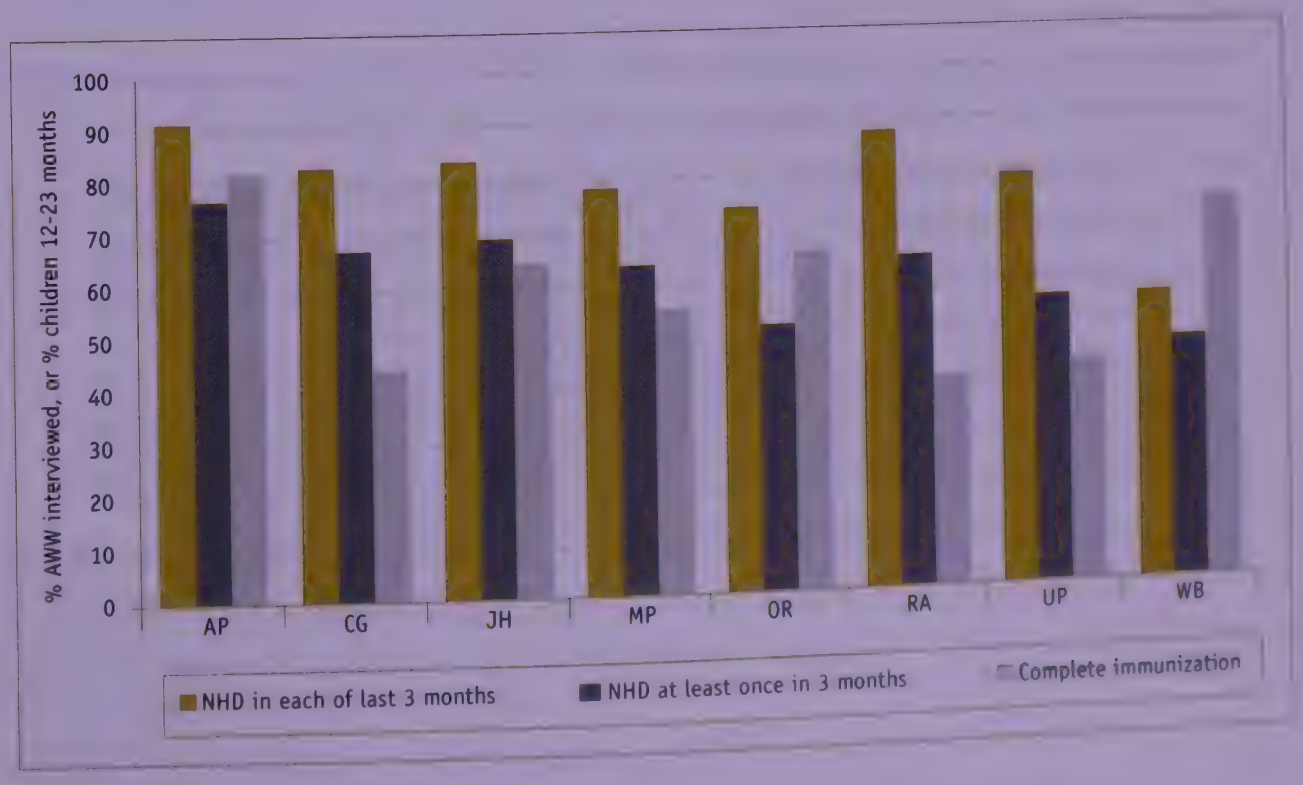
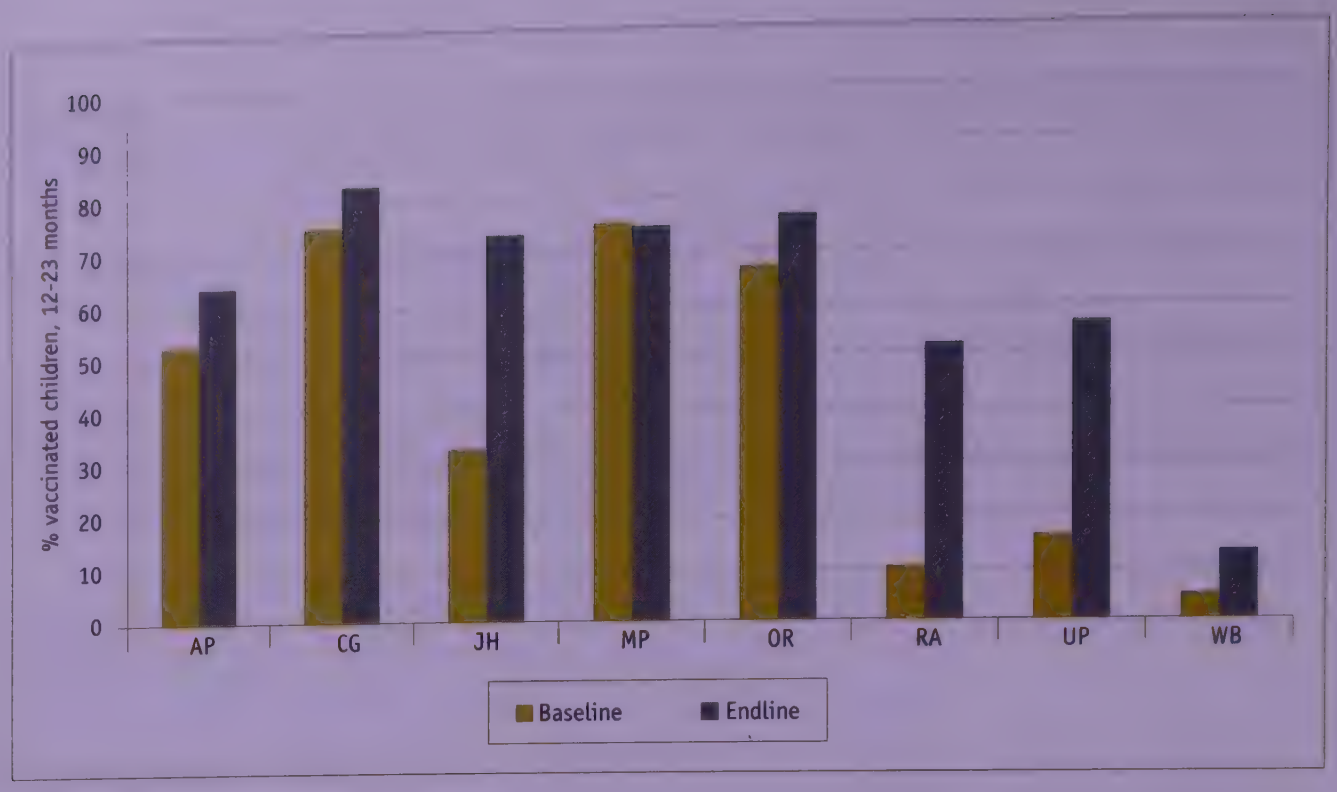


Figure 7.8: Reported regularity of NHD compared to complete immunization coverage, Endline (2006).

[7] The sub health center is the ANM's post and official residence.

Figure 7.9: Proportion of children getting vaccines at the AWC, Baseline (2001) and Endline (2006).



getting immunized at AWCs. Figure 7.9 provides evidence from baseline and endline surveys that this has indeed happened over the life of the program. In three states where immunization rates were known to be low at the baseline, Jharkhand, Rajasthan and Uttar Pradesh, there were large increases in the proportion of children being immunized at the AWC, with modest increases in most other states. Madhya Pradesh maintained a high of over 75 percent from baseline to endline. Only in West Bengal, where immunization happens mostly at the sub-health centers and immunization rates are fairly high, has the role of the AWC remained marginal (although the AWW may still play a role in mobilizing families to seek immunization services). In all other states, the majority of children are now getting immunized at the AWC.[8]

The relationship between receiving supplementary food from the AWC and vaccine coverage rates can be examined in several ways, since questions about the receipt of food supplements as well as vaccines were asked to respondents (mothers) in all surveys. Figures 7.10a, 7.10b, 7.11a and 7.11b present, for children 12-23 months old, simple comparisons between the baseline and the endline of reported food supplement receipt rates during a particular period of infancy as reported by respondents at the endline survey, and of the current coverage of one antigen normally given during the same period of recall:

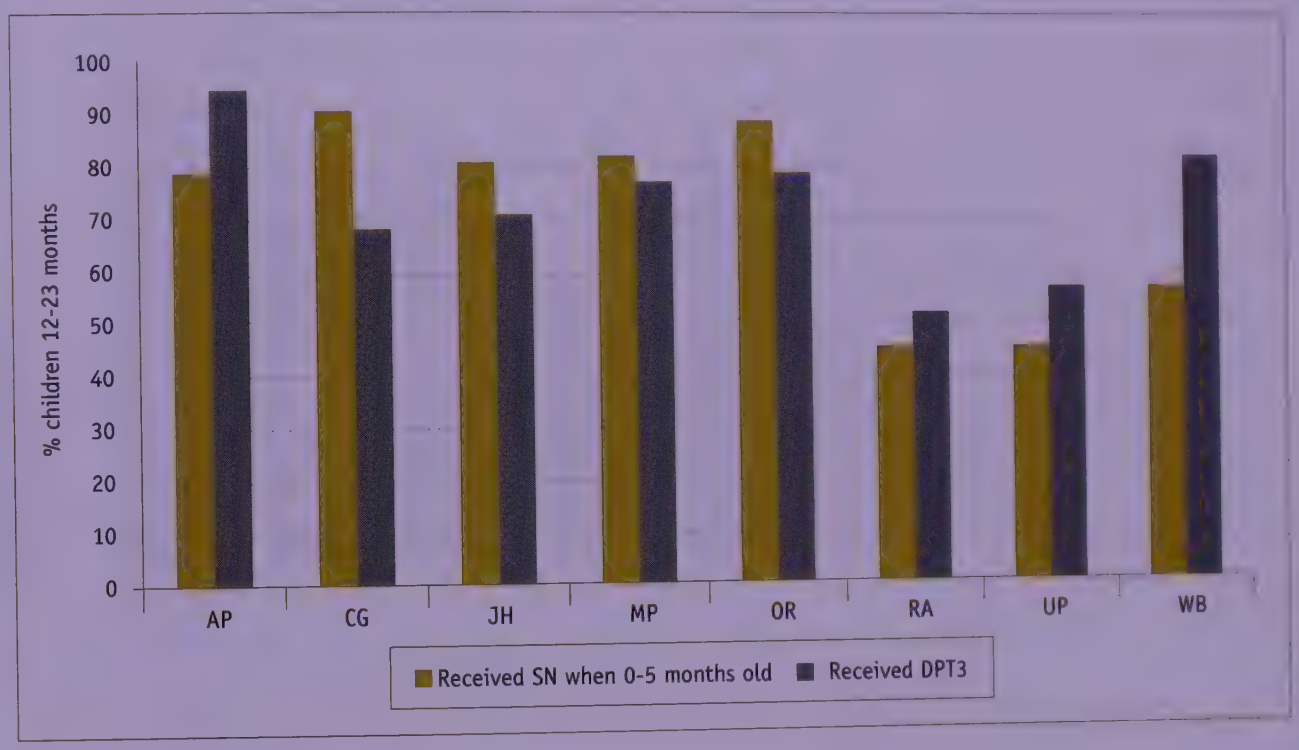
- Figure 7.10 compares receipt of food at ages less than six months with DPT3 coverage, at the baseline (7.10a) and the endline (7.10b) across states. At the baseline, rates of receipt of food supplements and the rates of DPT3 coverage diverge widely, and the relationship appears to be inconsistent across states. At the endline, rates of food receipt and the rates of DPT3 coverage are much closer to each other, consistently across states.

- Figures 7.11a and 7.11b compare receipt of food supplements at ages more than six months with measles vaccine coverage at baseline and endline across states. Patterns are similar to those found in the case of DPT3: food receipt

[8] Interestingly, this is not true of antenatal check-ups, perhaps because of the lack of privacy referred to earlier.

Figure 7.10a: Receipt of food supplements at 0-5 months and DPT3 coverage, Baseline (2001).

Figure 7.10b: Receipt of food supplements at 0-5 months and DPT3 coverage, Endline (2006).



and measles coverage rates appear closer to each other at the endline than at the baseline.

These findings seem to indicate that while food supplementation without any explicit convergence with health services was by itself insufficient to drive immunization coverage (as seen at the baseline), the NHD approach, which emphasized fixed-day, fixed-site outreach services at the AWC, did bring the service delivery and communities together and led to an increase in coverage rates.

A more direct measure of the influence of food supplements on immunization coverage rates is presented in Table 7.3. This examines, for the endline, the relationship between the receipt or non-receipt of food supplements at different periods and complete immunization rates among these two groups for each state. As can be seen, except in Andhra Pradesh, the receipt of food supplements during at least one of the three periods (pregnancy, child's age less than six months, child's age greater than six months) is significantly associated with the child being fully immunized. The relationship holds strongly across all three periods in the states of Orissa, Rajasthan and Uttar Pradesh. At the same time, it is clear

Figure 7.11a: Receipt of food supplements at 6+ months and measles vaccine coverage, Baseline (2001).

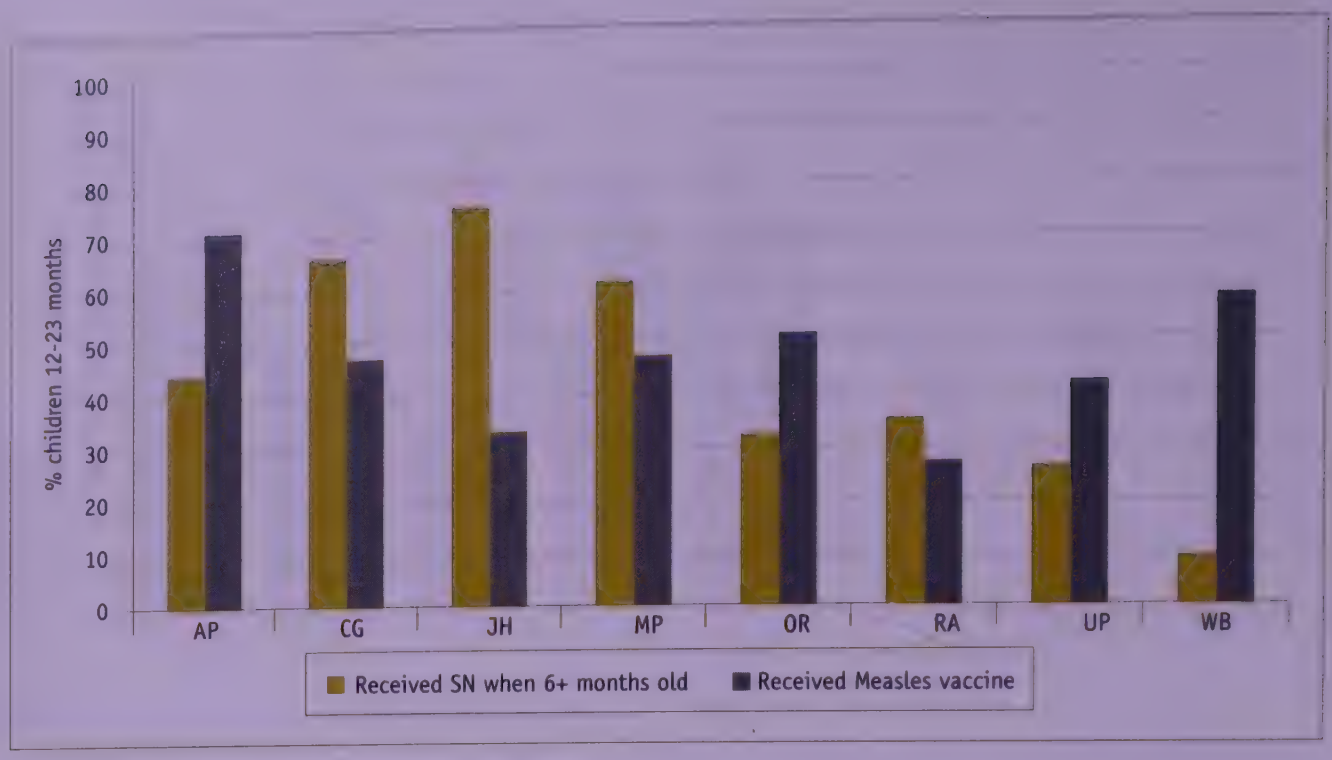
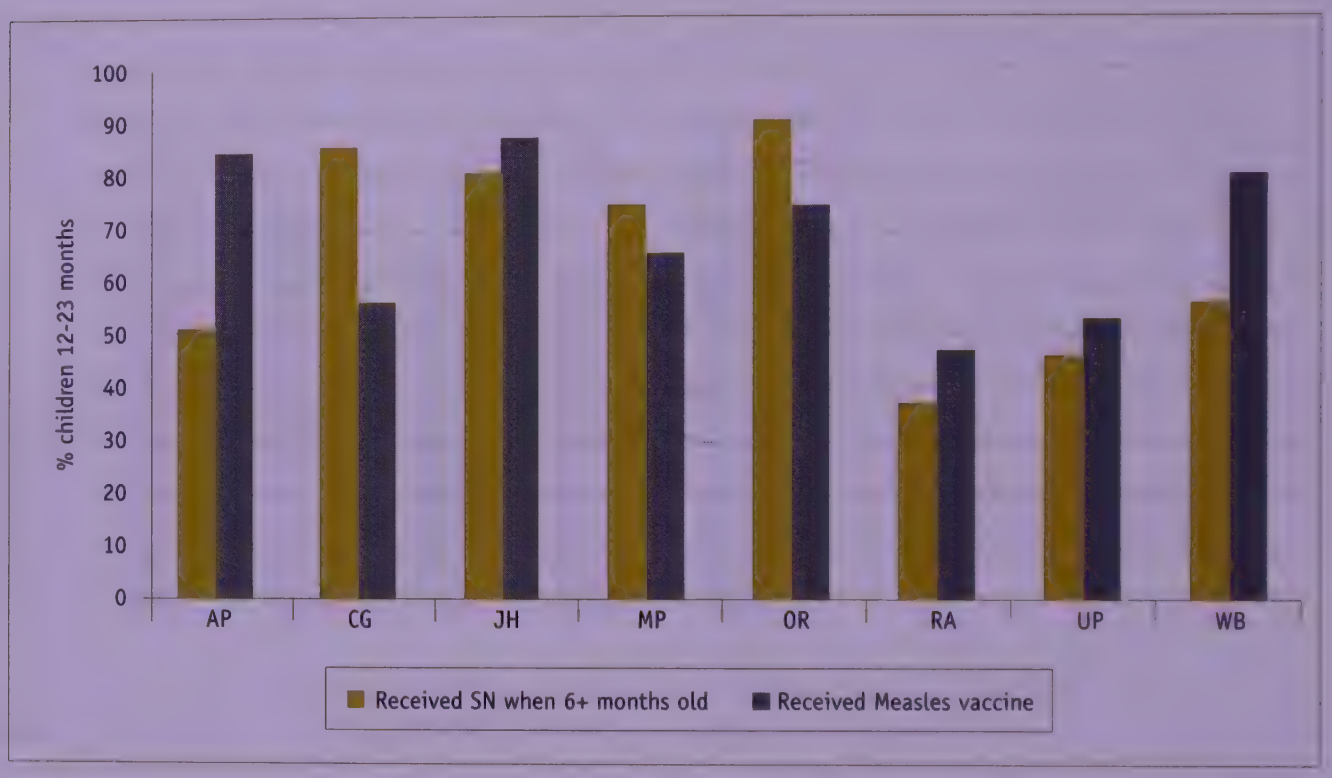


Figure 7.11b: Receipt of food supplements at 6+ months and measles vaccine coverage, Endline (2006).



that even food recipients do not have satisfactorily high immunization rates in most states,[9] and thus other factors must play a significant part. The influence on immunization rates of making access to food supplements universal thus depends on the current coverage with food supplements, and the differential immunization coverage between those currently receiving or not receiving food supplements. As shown in the table, in Rajasthan for instance, where coverage with food supplements is low, universalization of food supplements, if it can be accomplished, is likely to yield an increment of about 11-14 percentage points in complete immunization coverage,[iii] at the given level of NHD quality. In other states, the effect of universalization of food supplements on immunization coverage can be predicted to be smaller.

In interpreting these results, it would appear that the NHD approach has contributed significantly to the increased immunization coverage by the program

[9] A similar analysis for the baseline, not shown in this paper, reflects what Figures 10 and 11 indicate: food receipt is only weakly related to immunization coverage. Again, this strengthens the likelihood that it is the organizing influence of NHD, which became more widely prevalent by the endline, rather than food supplements without linkages with other health services, that drives immunization rates.

Table 7.3: Influence of food supplement on full immunization rates (card or recall), 12-23 months, EL (2006)

		AP		CG		JH		MP		OR		RA		UP		WB	
		N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI
Complete immunization coverage		*468*	82.0	*384*	43.3	*437*	63.9	*409*	55.4	*428*	64.7	*450*	40.2	*466*	43.0	*474*	74.4
Received ICDS food supplements when pregnant	No	*70*	75.7	*49*	38.8	*100*	59.0	*75*	42.7	*60*	35.0	*239*	30.5	*266*	37.2	*154*	67.5
	Yes	*398*	83.7	*335*	44.8	*337*	66.8	*334*	58.4	*368*	69.6	*211*	52.1	*200*	50.5	*320*	75.9
	Difference (No-Yes)		8.0		6.0		7.8		15.7*		34.6***		21.6***		13.3**		8.4
	% FI increase if Yes = 100%		1.2		0.8		1.8		2.9		4.9		11.4		7.6		2.7
Received ICDS food supplements when child < six months old	No	*99*	77.8	*36*	22.2	*80*	53.8	*74*	41.9	*49*	32.7	*245*	30.6	*255*	37.3	*200*	66.0
	Yes	*369*	83.7	*348*	46.3	*357*	67.5	*335*	58.5	*379*	68.9	*205*	52.7	*211*	49.8	*274*	78.5
	Difference (No-Yes)		6.0		24.0**		13.8*		16.6**		36.2***		22.1***		12.5**		12.5**
	% FI increase if Yes = 100%		1.2		2.3		2.5		3.0		4.2		12.0		6.9		5.3
Received ICDS food supplements when child six + months old	No	*223*	83.0	*60*	48.3	*78*	64.1	*108*	49.1	*48*	37.5	*281*	32.0	*252*	35.7	*210*	70.0
	Yes	*245*	82.0	*324*	43.2	*359*	65.2	*301*	57.8	*380*	68.2	*169*	55.0	*214*	51.4	*264*	75.8
	Difference (No-Yes)		-0.9		-5.1		1.1		8.7		30.7***		23.0***		15.7**		5.8
	% FI increase if Yes = 100%		-0.5		-0.8		0.2		2.3		3.5		14.3		8.5		2.6

%FI = % fully immunized; *significant at 95% confidence level; **significant at 99% confidence level; ***significant at 99.9% confidence level.

endline, acting through multiple ways. It has helped strengthen predictable outreach services where they were not happening earlier; has provided a formal forum for convergence with ICDS (and possibly local community groups) and thus increased the number of hands available to conduct immunization sessions. At least in some situations, the food incentive has contributed to greater participation in services at the NHD. Bigger gains can be expected by strengthening the quality of NHDs through effective use of counseling at the right time and tracking mechanisms to identify children due for immunization at each NHD. Another paper in this series, *Supplemental Feeding*, deals in greater detail with the different ways in which food supplements influence services.

Immunization Card

The issuing and retention of immunization cards are important indicators of the seriousness of the effort by the Health system and level of awareness among families. As seen in Table 7.1, program-wide, the proportion of mothers reporting that they had been issued immunization cards increased 20 percentage points to 73 percent by the endline, while the proportion actually able to produce an immunization card by the time of the survey increased by approximately 15 percentage points. Card receipt either reached near-universal levels or rose by over 15 percent in all states other than Chhattisgarh. Card retention rates, however, are high only in West Bengal (82.5 percent), and increases in card retention range from 3.8 percentage points in Chhattisgarh to about 32 percentage points in Orissa. Thus, while there are clear signs of increased effort in most states, the use of immunization cards has become the norm only in West Bengal.

Contacts, Advice and Motivation

As part of the endline household survey, respondents (mothers) were asked whether they were aware of a NHD being held at the AWC or such an event happening in their village. In addition, they were asked whether any service provider or volunteer[10] had contacted them over the previous one month and given information or advice related to immunization. They were also asked if, when the child was last immunized, someone had come to their home and asked them to take the child to the immunization session or if they had taken the child on their own initiative. Table 7.4 presents the responses, and compares complete immunization rates between those who answered each of these questions positively or negatively. As can be seen, each of these four factors shows a strong association with immunization coverage in almost all states other than West Bengal. The strongest association appears to be in Orissa, Rajasthan and Uttar Pradesh. In West Bengal, the only factor that may have had some influence is whether the child was called for immunization when last immunized.

The possible programmatic importance of each of these individual factors may be estimated by calculating the likely increase in overall immunization coverage if the factor alone were applied universally to the population. One can predict that contacting all families to tell them about immunization is likely to yield increments in complete immunization coverage of about 18 percent points in Rajasthan or 21 percentage points in Orissa, and that other states are likely to gain less than 10 percent points by a similar initiative.[iv]

[10] INHP-II had developed a cadre of community volunteers called Change Agents to mobilize communities, promote positive behaviors and support front-line workers.

Table 7.4: Influence of selected program indicators on full immunization coverage rates (card or recall), 12-23 months, Endline (2006)

		AP		CG		JH		MP		OR		RA		UF		WB	
		N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI
All		*468*	82.0	*384*	43.3	*437*	63.9	*409*	55.4	*428*	64.7	*450*	40.2	*466*	43.0	*474*	74.4
Mother aware of what "NHD" is	No	*96*	75.0	*172*	39.5	*290*	57.8	*261*	52.2	*289*	57.0	*258*	28.8	*254*	36.2	*355*	72.7
	Yes	*372*	83.8	*212*	46.1	*147*	76.5	*148*	61.0	*139*	80.8	*192*	55.5	*212*	51.3	*119*	79.8
	Difference (No-Yes)		-8.8*		-6.6		-18.7***		-8.8		-23.8***		-26.7***		-15.1**		-7.1
	% FI increase if Yes = 100%		1.8		2.8		12.6		5.6		16.1		15.3		8.3		5.4
Mother aware that NHD happens in the village	No	*112*	72.7	*81*	30.5	*234*	55.8	*203*	49.9	*278*	56.3	*215*	26.2	*273*	36.9	*416*	74.1
	Yes	*356*	85.0	*303*	46.4	*203*	72.5	*206*	60.8	*150*	80.2	*235*	53.1	*193*	51.7	*58*	76.8
	Difference (No-Yes)		-12.3**		-15.9**		-16.7***		-10.9*		-23.9***		-26.9***		-14.8**		-2.7
	% FI increase if Yes = 100%		3.0		3.1		8.6		5.4		15.5		12.9		8.7		2.4
Contacted in the last month and informed/counseled about immunization	No	*179*	74.2	*173*	34.0	*193*	67.3	*285*	51.4	*282*	53.9	*368*	35.8	*238*	35.1	*280*	73.0
	Yes	*289*	87.2	*210*	51.1	*244*	61.2	*125*	64.5	*146*	85.5	*82*	59.7	*228*	51.1	*194*	76.6
	Difference (No-Yes)		-13.0***		-17.1***		6.1		-13.1*		-31.6***		-23.9***		-16.0***		-3.6
	% FI increase if Yes = 100%		5.2		7.8		-2.7		9.1		20.8		19.5		8.1		2.2
Someone came to call the child to the immunization when the child was last vaccinated	No	*27*	69.2	*98*	27.0	*95*	48.1	*67*	46.4	*34*	36.5	*173*	21.9	*141*	24.1	*152*	66.3
	Yes	*441*	82.8	*282*	49.1	*342*	68.3	*342*	57.2	*394*	67.2	*277*	51.9	*325*	51.1	*322*	78.2
	Difference (No-Yes)		-13.6		-22.1***		-20.2***		-10.8		-30.7***		-30.0***		-27.0***		-11.9**
	% FI increase if Yes = 100%		0.8		5.8		4.4		1.8		2.5		11.7		8.1		3.8

%FI = % fully immunized; *significant at 95% confidence level; **significant at 99% confidence level; ***significant at 99.9% confidence level.

Table 7.5: Influence of selected background variables on full immunization rates (card or recall), 12-23 months, EL (2006)

		AP				CG				3H			
		BL		EL		BL		EL		BL		EL	
		N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI
All		*351*	66.1	*468*	82.0	*371*	39.1	384	43.3	*443*	27.6	*437*	63.9
SES	Low	*145*	57.1	*264*	80.9	*263*	37.8	226	47.7	*164*	23.6	*270*	61.3
	High	*206*	72.5	*204*	83.3	*108*	42.1	158	37.0	*278*	30.0	*167*	67.6
	Difference (low-high)		-15.4**		-2.4		-4.3		10.7		-6.4		-6.3
Sex of child	Boy	*180*	66.8	*253*	82.0	*176*	40.4	190	43.9	*246*	27.9	*245*	64.0
	Girl	*171*	65.4	*215*	82.0	*195*	37.9	194	42.6	*196*	27.3	*192*	63.8
	Difference (boy-girl)		1.4		0.0		2.5		1.3		0.6		0.2
AWC in same hamlet as the home of the respondent	No			*20*	75.7			33	44.7			*50*	53.1
	Yes			*448*	82.2			348	43.2			*387*	65.3
	Difference (No-Yes)				-6.6				1.5				-12.1
Walking distance to AWC	< 10 Min			*334*	83.8			278	44.5			*296*	65.9
	> 10 Min			*134*	77.7			106	39.9			*141*	59.7
	Difference (No-Yes)				-6.1				4.6				-6.1
Mother Literate	No	*224*	59.2	*242*	82.3	*260*	36.4	219	42.0	*300*	22.8	*312*	60.5
	Yes	*127*	78.3	*226*	81.6	*111*	45.2	165	44.9	*143*	37.9	*125*	71.8
	Difference (No-Yes)		-19.1***		0.7		-8.8		-2.9		-15.1**		-11.3*

%FI = % fully immunized; *significant at 95% confidence level; **significant at 99% confidence level
***significant at 99.9% confidence level

Since information about these factors was not available from the baseline, it is not possible to provide comparative analysis of either the prevalence of these factors across the baseline to endline, nor of any change in the influence of these variables on immunization rates over the life of the program.

In sum, it appears that many of the simpler operational issues related to provider practices seem to be well-grounded, but quality issues persist. As these are self-reported practices, it is difficult to assess the regularity and consistency of these practices without further survey or monitoring data.

Background Factors

Table 7.5 on pp. 24-25 provides evidence of the influence of selected background variables – a socioeconomic score (SES), sex of the child, maternal literacy, and two indicators of the distance of the AWC from the home of the respondent and shows change over time in the extent of their influence on immunization rates. The findings from a bi-variate analysis are:

- In general, the influence of these variables appears to have been stronger at the baseline than at the endline.
- In the case of two states, Uttar Pradesh and West Bengal, immunization coverage rates in boys were significantly higher than in girls at the baseline, but the differences disappeared by the endline. At the endline, there are no clearly discernible gender differences in any state.

	MP				OR				RA				UP				WB			
	BL		EL		BL		EL		BL		EL		BL		EL		BL		EL	
	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI	N	% FI
	371	39.1	*409*	55.4	*323*	44.8	*428*	64.8	*376*	22.3	*450*	40.2	*328*	37.8	*466*	43.0	*348*	51.4	*474*	74.4
	263	37.8	*238*	49.3	*175*	39.7	*266*	58.7	*205*	16.4	*171*	24.0	*172*	28.0	*224*	37.0	*158*	46.6	*160*	75.5
	108	42.1	*171*	64.0	*148*	50.8	*162*	74.8	*172*	29.3	*279*	50.6	*157*	48.6	*242*	48.7	*189*	55.5	*314*	73.9
		-4.3		-14.7**		-11.1*		-16.1**		-12.9**		-26.6***		-20.6***		-11.7*		-8.9		1.6
	176	40.4	*215*	55.2	*165*	39.7	*222*	67.5	*211*	24.5	*267*	41.3	*175*	42.8	*250*	40.2	*185*	56.5	*240*	73.7
	195	37.9	*194*	55.6	*158*	50.1	*206*	61.7	*165*	19.4	*183*	38.6	*154*	32.2	*216*	46.4	*162*	45.6	*234*	75.2
		2.5		-0.4		-10.4		5.9		5.1		2.8		10.6		-6.2		10.9*		-1.5
			51	39.0			*126*	60.0			*55*	46.9			*74*	37.0			*182*	73.4
			358	57.7			*302*	66.8			*395*	39.3			*392*	44.2			*292*	75.1
				-18.7*				-6.8				7.6				-7.2				-1.7
			268	57.1			*252*	67.5			*307*	45.0			*299*	40.5			*329*	76.2
			141	52.2			*176*	60.6			*143*	30.1			*167*	44.4			*145*	70.4
				4.9				6.9				14.9**				-3.9				-5.8
	260	36.4	*193*	42.8	*238*	36.6	*325*	59.2	*275*	16.8	*328*	31.7	*225*	30.2	*317*	38.2	*204*	43.6	*238*	68.5
	111	45.2	*216*	66.9	*85*	67.7	*103*	82.1	*101*	37.1	*122*	64.2	*103*	54.4	*149*	53.5	*144*	62.5	*236*	80.4
		-8.8		-24.1***		-31.1***		-22.9***		-20.3***		-32.5***		-24.2***		-15.3**		-18.9**		-11.9**

- Over the life of the project, immunization coverage increased amongst children of educated as well as uneducated mothers. Larger increments in immunization coverage were observed in children of uneducated mothers in Andhra Pradesh, Orissa and West Bengal, while in Madhya Pradesh, Rajasthan, and Uttar Pradesh, larger increments were seen in children of mothers with at least primary education. Chhattisgarh and Jharkhand showed marginal differences in the immunization coverage rates between the two groups.

- With respect to SES, larger increments in immunization coverage were observed in the lower half of the SES in Andhra Pradesh and West Bengal, whereas Madhya Pradesh and Rajasthan showed larger increments amongst the upper half of the SES. Between the baseline and the endline, the difference between the lower and upper SES halves narrowed more than 10 percentage points in Andhra Pradesh, Chhattisgarh, Uttar Pradesh and West Bengal, but increased by more than 10 percentage points in Madhya Pradesh and Rajasthan. The differential increments amongst the lower half and the upper half of the SES indicate that INHP-II partially succeeded in influencing immunization service provision to the most marginalized (per the SES). At the endline, however, the immunization coverage in the lower half of the SES remained significantly lesser than among the upper half lower in four states (Madhya Pradesh, Orissa, Rajasthan and Uttar Pradesh). More focused effort is required to close the equity gap between the two groups in accessing services.

- In most instances, the distance of the home from the AWC does seem to matter, but the differences in immunization coverage rates between those staying close to the AWC or far from it are small, becoming statistically significant in only a couple of states.

Multi-variate analysis should help to further discern the relative influence of the above factors on immunization rates.

Lessons from INHP in Improving Immunization Coverage: A Field Perspective

Overall, it is clear that available evidence does not permit a thorough and robust analysis of the influence of several important program elements. For instance, while at an aggregate level, evidence indicates that tracking and delivery systems improved, in the absence of specific studies to capture variations across villages, sectors and blocks and their links to immunization coverage rates, it is difficult to definitively say whether tracking and delivery systems were indeed strengthened across areas. Similarly, while vaccine supplies were by and large not a major concern in most states in the period of reference, specific instances of supply disruptions that could have influenced immunization rates have not been documented. Equally, disruptions in cold chains and local distribution mechanisms have not been examined for want of documented evidence. It should be recognized, of course, that collecting objective evidence related to such disparate program elements is not a simple task, even at small scale, and there are hardly any studies that establish one-to-one links between such elements.

In INHP-II, the choice of interventions prioritized were based on an analysis of the major operational problems of the immunization program at the end of INHP-I. An unacceptably large proportion of children were left out of services in the baseline in many states, and complete immunization rates remained low. While most communities had overcome the instinctive fear of child immunization programs by then, this had not translated into proactive attempts by communities to seek immunization services. There were still large gaps in the Health system's drive and ability to sustain a minimal level of reliability in immunization services and back-up assurance in case of problems. Thus, the prime focus of the program was to make immunization services more regular and accessible and to improve their utilization.

Information from the baseline and lessons learned in the program reinforced the need and benefit of strengthening day-to-day operations at the field level. For instance, while supply disruptions were seen at several points during the program in many states with respect to one or other antigen, this was not the bottleneck in most instances. Inadequate utilization of available services due to failure to implement long-established norms of outreach immunization programs was seen to be the main problem. Casually designed and maintained recording and tracking mechanisms, often not user-friendly, were also a common problem. Simple directives such as the need to open fresh vials of vaccines when only a few children were present were not followed. Supervisory mechanisms were cursory and inadequate to ensure that planned immunization

sessions actually happened, and failed to detect and correct glaring instances of program weaknesses, including excluded families and communities in the service network. Real denominators were almost never used for monitoring programs and deliberate over-reporting of coverage by program managers at the block or higher levels was common. While the ANM and the AWW regularly exchanged information and assistance, the process lacked rigor and was poorly supported by program managers of the two departments at higher levels, largely due to lack of coordination and blaming each other for inadequate performance. Years of focus on monitoring processes without objective evidence of progress on outcomes had blunted the ability and drive to seek results. A standard response at higher levels of the bureaucracy was that services were in place, but there was no demand for services.

The sharing of results from the RAPs in the panel districts in early 2004 at the district level provided opportunities to test the will of systems to turn things around at a stage when the program was just beginning to reach scale and work directly with program implementers in the ICDS and Health Departments. The initial indignation at the "unrealistically low" estimates of immunization coverage found in the surveys soon gave way to willingness to sit together and plan for greater effectiveness, at least in these eight districts for which objective coverage figures were available. Other districts later also conducted joint planning exercises involving Health and ICDS, using available data. A key feature of these planning exercises was that they planned for other major activities in maternal and child health, along with increasing immunization coverage. This enabled realistic plans to be drawn up. Another feature was the customization of plans for local contexts such as access, and staff vacancies. These plans focused attention on addressing basic operational issues such as the regularization and simplification of register formats, where feasible; joint generation of due-lists by AWW and ANM; joint reviews at sector and block levels using coverage data with denominators; and fresh emphasis on making fixed-day, fixed site immunization possible by revisiting operational problems of ANM schedules. Additional training needs were also identified and addressed.

As this approach was implemented district by district, involving different sets of system staff and INHP teams, there was considerable variability in the pace and intensity of progress across districts. There were some clear instances of these processes yielding immediate results. For instance, in Bankura, the panel district of West Bengal, immunization coverage with most antigens was found to be very high, and yet was falling back in complete immunization coverage because measles immunization was low. This finding was addressed intensively over one year, and when the second round of assessments was conducted, and measles coverage (and full immunization) was seen to have increased substantially. In other districts, changes were slower to come by.

Other lessons were also being learnt. Data from the first round of RAPs found that receipt of food rations was only weakly associated with better service coverage in most states. The convergence of food rations with predictable health services was critical as was the attention to simple managerial issues in conducting

immunization sessions. This led to greater emphasis being placed on the operational issues of immunization sessions, even where ensuring the NHD was not easy. Another "best practice" that INHP-II began with was the use of social maps to identify left-outs and monitor drop-outs. It soon became apparent that while it served a useful purpose as a one-time tool to ensure that no community or cluster of homes was "falling through the cracks", a map was not the preferred mode of tracking service coverage for either the AWW or the local women's groups. Being local, they did not seem to need maps for this purpose. In fact, except where the AWW had a high level of formal education, even the use of service registers (such as the immunization register) was largely more beneficial for reporting than for tracking; they tracked children from memory rather than determining "due" children on the basis of immunization dates entered in the register. The main bottlenecks that prevented effective tracking were ensuring that a child got on to the immunization register soon after birth, that efforts were made to actually draw up and follow "due lists" and to remind specific families about the impending immunization session where they must bring their child. As it became increasingly clear over time, joint ICDS-Health Department reviews at sector and block levels were one of the more effective ways of tracking whether planned immunization sessions actually took place.

In comparison to service quality issues, "demand" side problems were not as significant. While every community had some families who refused vaccinations, these were the exception, not the rule. By and large, awareness and acceptance of immunization was high. In unexpected corners, one came across examples of heightened awareness, such as mothers in relatively remote communities in Jharkhand routinely queuing up for immunization with freshly purchased disposable syringes and needles because they found the reusable needles used by the ANM too blunt and painful for their children. It is also quite common in communities with relatively high coverage rates for mothers to arrive at the fixed-day, fixed-site immunization sessions without being informed or reminded. Field observations indicate that a high level of community participation is a logical outcome of regular and reliable services, not the other way around. Visibly regular and predictable services are more effective in obtaining "community participation" than intensified behavior change communication in the face of poor services.

In addition to these efforts to seek and solve simple operational problems, the program also supported several initiatives of UNICEF and other development partners in different states, such as the facilitation of micro-planning of immunization sessions, promotion of injection safety measures and, refresher training for cold chain maintenance. There were other areas requiring obvious reform, such as the management information system, and several attempts were made to influence such reform at state and national levels, independently or along with other agencies. However, the nature of these issues was such that it was not realistic to expect to see changes in outcomes on the ground within the life of the program as a direct result of these initiatives. CARE was also an active participant in the national UIP review in late 2004. The extensive report of that review echoes several lessons learned in the course of the INHP.

Conclusions

The INHP attempted to help the ICDS and Health Departments of the Government of India bring about sustainable change in primary immunization coverage rates across 75 districts in eight states between 2001 and 2006. The primary focus was on improving field operations at sub-district levels, converging efforts of ICDS and Health and promoting mechanisms to maximize outreach, especially to get the "left-outs" into the service fold. This paper examined available evidence to document change in immunization coverage rates and factors that influenced the change.

There was a significant increase in the coverage rates of individual antigens as well as full immunization with variations in the increments across states. While a few states continue to have significant numbers of children entirely unvaccinated, drop-out rates have reduced substantially across the program. Also, there has been a reduction in the numbers of children entirely unvaccinated, or the left-outs. While immunization rates continue to be higher among the upper half of the SES in half the states, significant reductions were seen in differentials between the upper and lower halves of SES in several states. Variations across states and districts can probably primarily be ascribed to the strengths and weaknesses in delivery systems and the focus and intensity of INHP implementation. Rajasthan and Uttar Pradesh are the two states that will require special attention.

The pace and extent of the increase in immunization coverage (children fully immunized) is greater in INHP-II areas over a five year period compared to the increase in overall state estimates (rural) over an eight year period between NFHS-2 and NFHS-3, with the exception of Chhattisgarh. NFHS data (rural) for the INHP-II states can serve as a reasonable comparison, given the absence of true controls.

One of the approaches of INHP, the NHD, appears to have contributed to the improved coverage. NHDs helped strengthen systems, encouraged regularity and predictability of outreach immunization sessions, converged efforts of the AWW and the ANM and mobilized community volunteers, community based organizations and local governance institutions i.e., the Panchayati Raj Institutions, around getting children immunized. The NHD also explicitly linked supplementary feeding in the form of take-home rations to health service delivery, thus facilitating food distribution to serve as an incentive to avail services. A number of related elements, including training of functionaries, use of improved tracking mechanisms to ensure universalizing services, e.g., the catchment area approach, drawing up "due lists " prior to each immunization session, use of data from internal information systems and from independent assessments, and the use of convergence mechanisms between ICDS and Health undoubtedly helped in extending outreach and reducing left-outs and drop-outs. For improving effectiveness of NHDs as they get further replicated, it is important to ensure that these elements form an integral part of the core minimum NHD package, along with the distribution of rations and immunization.

Early registration of pregnant women at the AWC, presumably for supplementary feeding had a positive association with full immunization coverage. This

highlights the importance of universally getting pregnant women into the service fold and tracking the mother-child pair for the complete set of health services.

The INHP experience indicates that weaknesses of supply gaps and the demand side issues are actually not the bottlenecks that limit high coverage. The lack of attention to simple tracking processes and poor supervision, and unsatisfactory provider knowledge and skills are bigger challenges.

The achievements and challenges described here are ultimately reliant upon in quality of existing government systems, and the approaches used could best be sustained by reorganizing existing resources to improve effectiveness and efficiency and using well-established principles of organizing immunization services. The INHP merely played a catalyst role in establishing or improving such processes.

One lesson that has been repeatedly learned in immunization programs globally is that hard-earned gains can be quickly lost when one or other of the many elements that sustain such programs are neglected. The next steps must be to find ways of helping key delivery mechanisms become established and respected traditions within public health programs, with sufficient internal and external checks and balances to ensure timely identification of slippages and their rectification. Now that improved coverage is being established, it is time to pay attention to quality and ensure that immunization translates into effective protection and reductions in child morbidity and mortality. For many of these states, the battle has only begun.

Endnotes

i The shifting of universe between baseline and endline in the case of Jharkhand/Bihar and Madhya Pradesh/Chhattisgarh in the RACHNA program has been discussed in the paper entitled *Methods used for Assessments*. For NFHS as well, the creation of new states between the second and third rounds resulted in problems of comparability across rounds. Some of the relevant issues are as follows:

- Only sparse summary estimates of immunization coverage for Chhattisgarh and Jharkhand are available, since these had to be derived from NFHS-2 data for erstwhile Madhya Pradesh and Bihar, and these derivations have not yielded representative results. Also, rural/urban disaggregated figures are not available for these states for NFHS-2, and the estimates of increments in coverage between NFHS-2 and NFHS-3 are not based on rural estimates but on overall state estimates (while the figures for the other states are all based on rural estimates). Absolute coverage for NFHS-3 as depicted in Figures 3 to 5 is for rural areas, however, for all states including Chhattisgarh and Jharkhand.
- In the case of Madhya Pradesh, the three CARE-assisted districts (Seoni, Chhindwada and Balaghat) are known to be among the most poor-performing districts of the state, bordering Chhattisgarh, and thus are atypical of the state as a whole. The RACHNA baseline for Madhya Pradesh is also not representative of the current three Madhya Pradesh districts, since most of the area covered by RACHNA then is now in Chhattisgarh. Thus, although Chhattisgarh and Madhya Pradesh share the same baseline for RACHNA, this baseline is more true for Chhattisgarh than for Madhya Pradesh. It is difficult to find a representative baseline for the current RACHNA districts of Madhya Pradesh.
- In the case of Jharkhand, the large percentage increment in NFHS starts from a very low estimate for the baseline (8.8 percent), while the higher baseline for RACHNA comes mainly from areas of Bihar that were a part of INHP-I but were later dropped from the program universe for INHP-II.

ii There are differences, usually of not more than a few percentage points, between coverage rates reported in this paper and those found in the report on the Final Evaluation of the RACHNA

program (May 2006). These differences arise from two main reasons: further cleaning of endline survey data and differences in definitions used for deriving estimates. The Final Evaluation report carried estimates for a limited number of outcome variables that represented the results committed by the program to the donor. For instance, among all antigens, only tetanus toxoid and measles vaccine coverage were reported in the Final Evaluation report. These estimates had to follow definitions (numerators, denominators, exclusions, etc.) that closely matched the definitions used at the baseline in 2001 (some of which again had a historical base in the INHP-I baseline of 1996). The current paper makes no attempt to restrict itself to those definitions, but uses the most robust and globally acceptable definitions and strives to maintain thorough internal consistency. Thus, equivalent definitions are applied to baseline and endline data. In sum, both, the baseline-endline comparisons in the RACHNA Final Evaluation report and the baseline-endline comparisons in this paper remain valid, and any numerical differences in indicator values between the two reports should not be construed to be errors.

iii These estimates, based on Table 7.3, are derived by subtracting average immunization rates for the full sample from the immunization rates among those who report that they had received food supplements. This difference will be large in cases where the proportion of non-food-recipients is large, and the immunization rates in food recipients is much larger than in non-recipients. This is true particularly of Rajasthan. This is explained further in the next endnote.

iv As in the case of food supplements discussed earlier, the estimates are derived by subtracting the immunization rates in the population from the immunization rates among those that were exposed to the factor under consideration, such as those who were aware of NHD or those who were contacted and counseled about immunization in the previous month. This is the equivalent of population attributable risk, and will be higher when the number as yet unexposed to the intervention is still high, and there is a large difference in the likelihood of getting immunized among those exposed and not exposed to the intervention. This could have important programmatic implications. For instance, in Orissa, the difference in immunization coverage among those counseled and contacted in the previous month is 31.5 percent more than those not contacted and counseled, and the difference among those called for immunization and not called is 30.8 percent. The influence of the two factors appears similar. However, currently, just about a third of children are being contacted and counseled about immunization, while 92 percent are being called for immunization, presumably on the day there is an immunization session in the village. By ensuring that all children/families are contacted and counseled about immunization, there is likely to be a gain of about 20 percentage points in average immunization rates in Orissa, but by ensuring that everyone is merely called for immunization the same day is likely to yield an increase of merely 2.5 percent. From a program perspective, it would be more beneficial therefore to push for an increase in the proportion of families contacted and counseled. Multivariate analysis controlling for a number of variables could help make more refined estimates of the strengths of such influences.

(Contd. from inside of the front cover)

in at least some of the states, the equity gap for immunization coverage narrowed over the project life. By the endline, the majority of children in seven of the eight states were receiving vaccines at the AWC, indicating the level of coordination that can be achieved between ICDS and health programs to make it more convenient for families to access services.

Several key factors appear to have contributed to positive change: the organizing influence of NHD where the *Anganwadi* Workers (AWW) and the Auxillary Nurse Midwife (ANM) come together to provide services, the active involvement of ICDS and the AWW that made tracking children more feasible, the incentive-function of food supplements given out at the AWC along with immunization, the attention paid to the use of registers and other tracking systems, greater outreach of service providers to homes to inform and advice about immunization, the regular joint reviews between ICDS and health officials at block and district levels, and the use of coverage data generated independently of routine reporting for the purpose of monitoring and planning. Variations across states and districts can probably primarily be ascribed to the strengths and weaknesses in delivery systems and the focus and intensity of INHP implementation. This experience suggests that simple but consistent inputs can lead existing systems to achieve significant improvement in immunization coverage at scale.

This series of working papers was envisioned and written by persons actively involved in the program design and implementation. USAID/BASICS directly contributed to the writing and production of this series of papers in several ways before it closed in India in December 2007. The IMMUNIZATIONBasics projects reviewed several drafts and provided valuable comments and suggestions. A number of data support and field staff gave invaluable contributions, and the papers were reviewed by CARE-India and USAID/India staff.

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About RACHNA

Two major projects of the Reproductive and Child Health, Nutrition and HIV/AIDS (RACHNA) program of CARE-India completed five years of work supported by funds from USAID in late 2006. The second phase of Integrated Nutrition and Health Project (INHP-II) was aimed at helping reduce child malnutrition and mortality. The rural component of the *Chayan* project primarily addressed the unmet need for spacing methods, while its urban component attempted to reduce HIV transmission among at-risk groups. Together, the projects covered 78 districts and 22 cities, spread over 10 states, and worked closely with key national programs and a spectrum of different partners. This series of working papers documents the results and lessons from these five years.

Other Papers in this Series

Executive Summary: What we have learnt so far

Paper 1 : What RACHNA has Done So Far: Program Description

Paper 2 : Methods Used for Assessments in the RACHNA Program

Paper 3 : Enhancing Newborn Care

Paper 4 : Changing Infant and Child Feeding Behaviors

Paper 5 : Widening Coverage of Micronutrient Supplements

Paper 6 : Supplemental Feeding: It's Role in a Large Scale Maternal and Child Nutrition and Health Program

Paper 8 : Deepening Access to Spacing Methods

Paper 9 : HIV Prevention in Vulnerable Indian States

Paper 10 : Working with Existing Systems: Lessons from INHP

Paper 11 : Engaging Communities to Improve Health and Nutrition Outcomes: The Role of Community Volunteers in INHP

Paper 12 : A Cost Analysis of the RACHNA Program

Toolkit : Tools Used to Strengthen Program Implementation in INHP-II

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